Appendix C

Hourly Spill and Flow and Daily Average of High 12 Hour % TDG Data

(2006 Spill Implementation Status Monthly Reports to the US District Court)

FISH PASSAGE IMPLEMENTATION PLAN REPORT
April 2006

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

In accordance with the Court's instructions in the December 29, 2005 Opinion and Order, the U.S. Army Corps of Engineers (Corps) is providing the monthly report as described in the Fish Passage Implementation Plan (FPIP) submitted to the Court on April 3, 2006. The Corps' lower Columbia and Snake River project and fish passage operations for the month of April 2006 identified in the Order are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant 12-hour average total dissolved gas (TDG) for the tailwater at each project and for the next project's forebay downstream.

This report also provides information on issues presented and unanticipated or emergency situations that arose during implementation of the spill program for the month of April 2006.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per week in April displaying the progress of the spill program as follows:

(A). Daily Average of the High 12 Hourly % Total Dissolved Gas (TDG) Values - described in the upper graph.
(B). Hourly Spill and Generation Flows – described in the lower graph.

For the lower Snake River projects: Lower Granite, Little Goose, Lower Monumental, and Ice Harbor dams, the weekly graphs begin on April 3. For the lower Columbia River projects: McNary, John Day, The Dalles, and Bonneville dams, the weekly graphs begin on April 10.

Each figure represents one week of operation for a project. The graphs start on Monday 0100 hours through Monday 0100 hours for the following dates:

April 3 – April 10	Figures 1 - 4
April 10 – April 17	Figures 5 - 12
April 17 – April 24	Figures 13 - 20
April 24 – May 1	Figures 21 - 28

A. Upper Graph: Shows the resultant daily average percent TDG for the 12 highest hours as the result of spill from the dam. The objective is to operate each project up to the TDG limits without exceeding those limits if possible.

- The blue line on the graph represents the TDG in the tailrace of the dam. 120% TDG is the upper operating limit.
- The green line represents the TDG in the forebay of the next dam downstream. 115% is the upper operating limit.

B. Lower Graph: Represents the flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The heavy red line represents the hourly flow through the spillway in kcfs.
- Each graph includes a heavy black line that represents the target spill. This is the hourly spill level as defined in the 2006 FPIP. This maximum spill level is subject to the following conditions:

    - Spill percentage or discharge specified in the FPIP;
    - Spill caps as set daily for TDG management;
    - Test spill levels for fish passage research; and,
    - Minimum generation for power system needs.

The hourly target spill may vary as a function of quantity of river flow and generating units available at a project.

II. A monthly table (Table 1) is included at the end of the report that shows the overall daily results of the average percent TDG for the 12 highest hours for all projects. The numbers in red show exceedances of the TDG gas cap - 115% (forebay) or 120% (tailwater) for each project.

Operations:

For the month of April, at Lower Granite Dam the hourly target spill was a fixed quantity of 20 kcfs through each day. At Little Goose Dam the target spill was 30% of the total flow, except when spill was limited to a lesser quantity to stay within the TDG limits. At Lower Monumental Dam there were periods when total spill was limited to quantities less than 40 kcfs, also to remain within TDG limits. At Ice Harbor, McNary, and John Day dams, the spill described in the FPIP varied from daytime to nighttime, and is shown as the heavy black line on the graph. At The Dalles and Bonneville dams, there were periods when spill levels were reduced to stay within TDG limits.

The month of April was characterized by above average flows on the lower Snake and Columbia rivers. Involuntary spill occurred frequently as high flows exceeded powerhouse capacity. As flows increased through the month, so did involuntary spill

levels. As a result there were many hours when the red line/volume of spill was higher than the heavy black/target spill. In many of these instances of involuntary spill, the resultant TDG exceeded the 115%/120% limits. Brief periods when the spill was below the level described in the FPIP can be seen on the graphs where the heavy red line dips below the heavy black line. When the operation varied from the target spill or other anomalies occurred, explanations are included in the table below.

Spill patterns at Bonneville Dam were slightly modified from the FPIP to help reduce TDG levels while providing acceptable passage conditions for juvenile fish. The new spill pattern was specified in 2 kcfs increments, switching to the Fish Passage Plan spill patterns when project spill levels exceed 92 kcfs. These changes were regionally coordinated and agreed to with the Fish Passage Operations and Maintenance Coordination Team (FPOM).

John Day spill operations as a result of units 1 – 4 being out of service were discussed with the Technical Management Team (TMT) and FPOM. This unit outage was described in the FPIP, with a statement that involuntary spill would occur during the daytime when flows exceeded approximately 246 kcfs. This condition existed during most of April. In response to System Operational Request (SOR) # 2006-3 dated April 4, the Corps agreed to closely monitor fish passage and hydraulic conditions, then if needed, address any observed problems through operational changes to assure efficient passage of migrating fish. The Corps continues to monitor the conditions to ensure that safe and efficient fish passage is maintained.

Juvenile fish transportation operations at lower Snake River projects began on April 20 at Lower Granite, April 24 at Little Goose, and April 28 at Lower Monumental dams. The FPIP called for transport to begin at all three projects on April 20. This staggered start to transport was coordinated through TMT and was in response to SOR # 2006-5, dated April 18. The court was notified of this FPIP change by letter on April 20. The letter included a biological justification prepared by NOAA Fisheries.

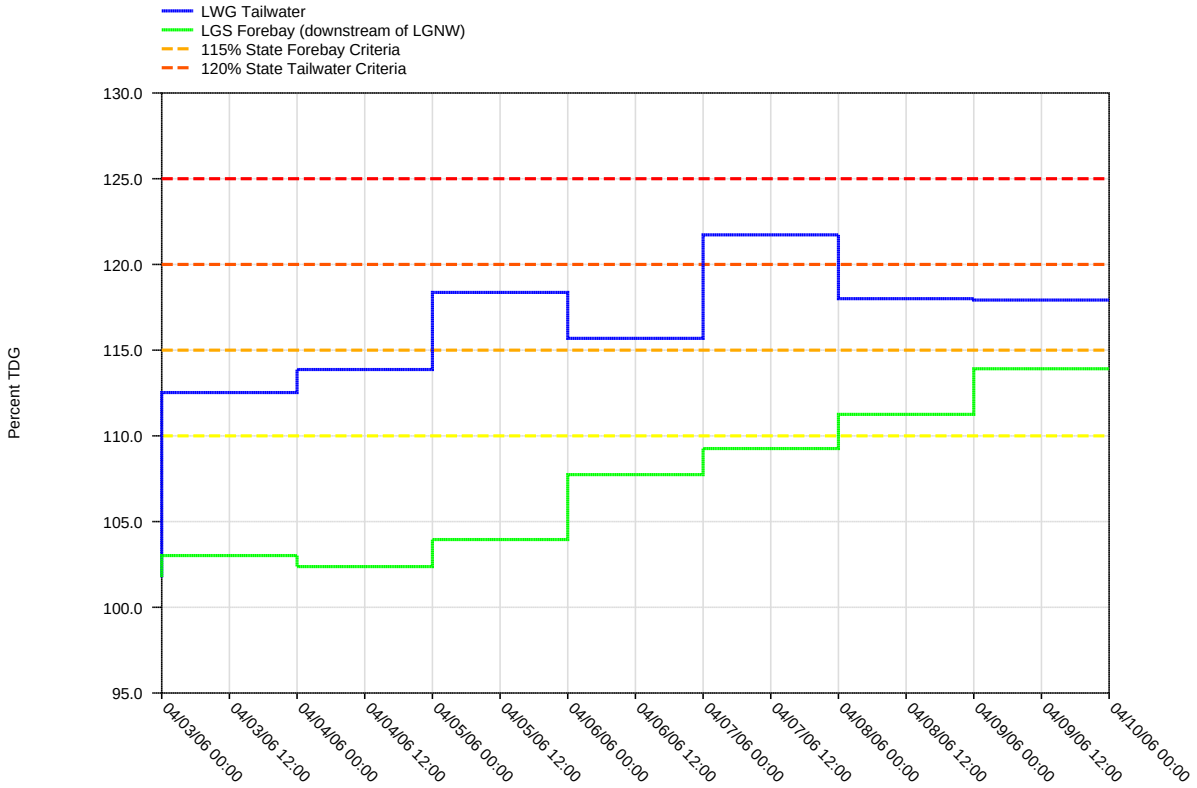
Variances from target spill and other anomalies in the graphs

Project	Parameter	Date	Time	Reason
Lower Monumental (Forebay)	% TDG Average at LMNA	4/15 – 4/17	1000 - 1200	No data transmission; failed cable.
	Spill Flow	4/28 4/29	2100 - 2200 1800 - 2000	Spill Flow reduced in order to allow fish barges to safely load fish for transport.
The Dalles	Spill Flow	4/11	0800 - 1100	Research equipment in one spillbay was in danger of breaking free and damaging the gates. Spill was reduced temporarily to prevent further equipment or spillway damage.
	Spill Flow	3 occurrences during 4/25 – 4/29	8 – 12 hr per occurrence	The spill gates are calibrated for a forebay elevation of 160 ft. At times the elevation dropped below 157 ft., causing the spill amount to be slightly less than

	% TDG (Tailwater)	4/28 – Present	2300 – present	the calibrated amount. Water quality gage is not transmitting data. USGS is currently working to resolve the problem.
Lower Granite	Spill Flow	4/22	2400	Project reduced spill to allow safe passage of tow barge. This operation requires about 20 minutes of reduced spill per request.
John Day	Spill Flow	4/18 4/19 4/21 4/22 4/29	0500 0300 2200 0200 1500	All events were the result of the project reducing spill to allow safe passage of a tow barge. Tow operators may request temporary reduction of spill to allow safe approach to the navigation lock at John Day, particularly when they are carrying hazardous materials. This special operation requires about 20 minutes of reduced spill per request.
Ice Harbor	Spill Flow	4/24	1500-1800	Spill flow was reduced as the Ice Harbor forebay approached the lower end of its operating range (elevation 437.0) to hold water and keep the forebay within its operating range.

Figure 1.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

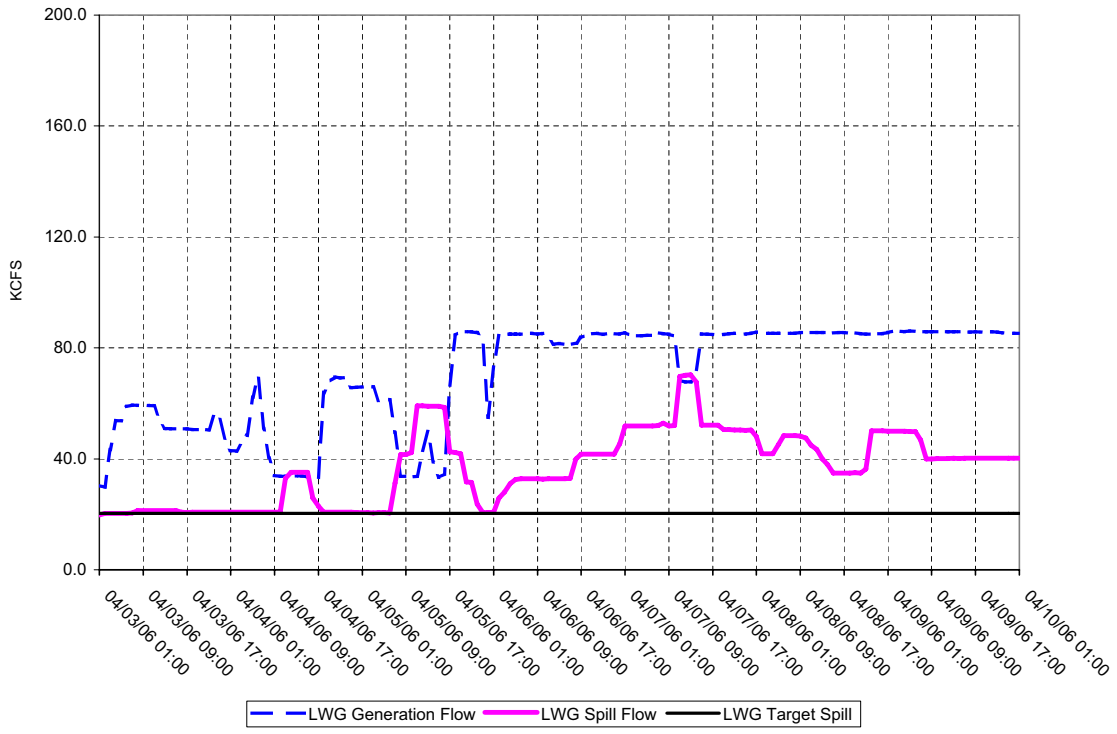
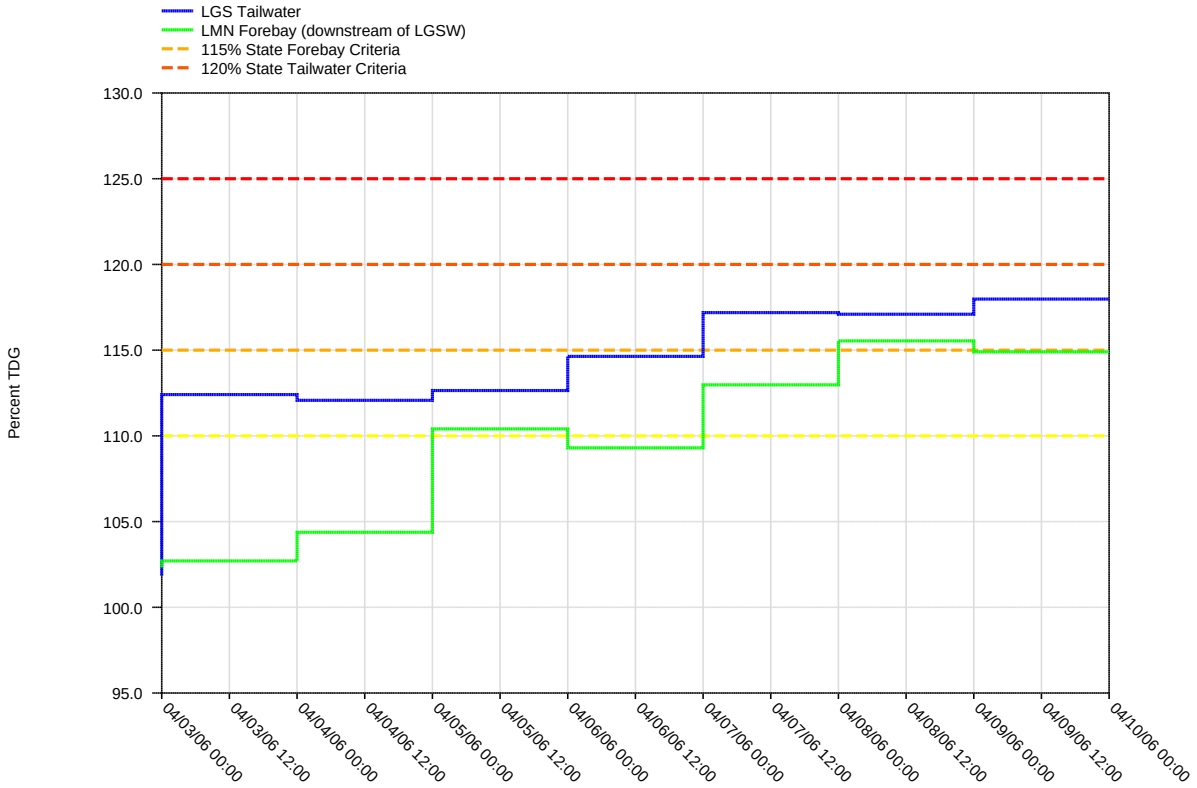


Figure 2.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

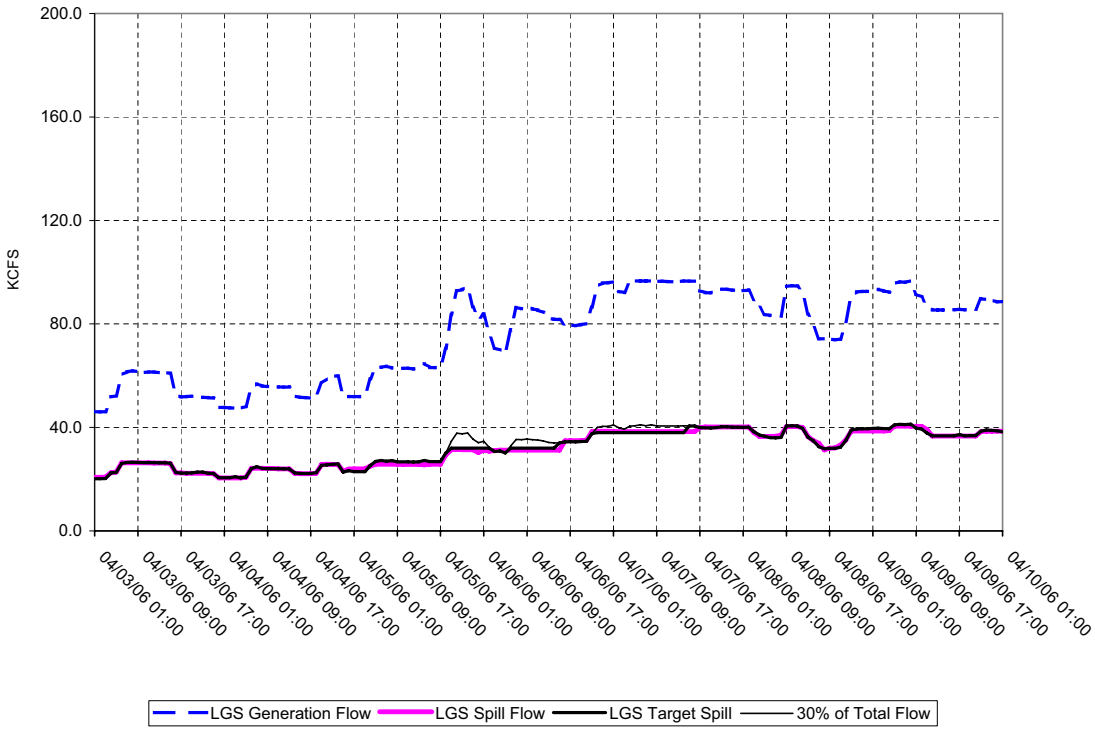
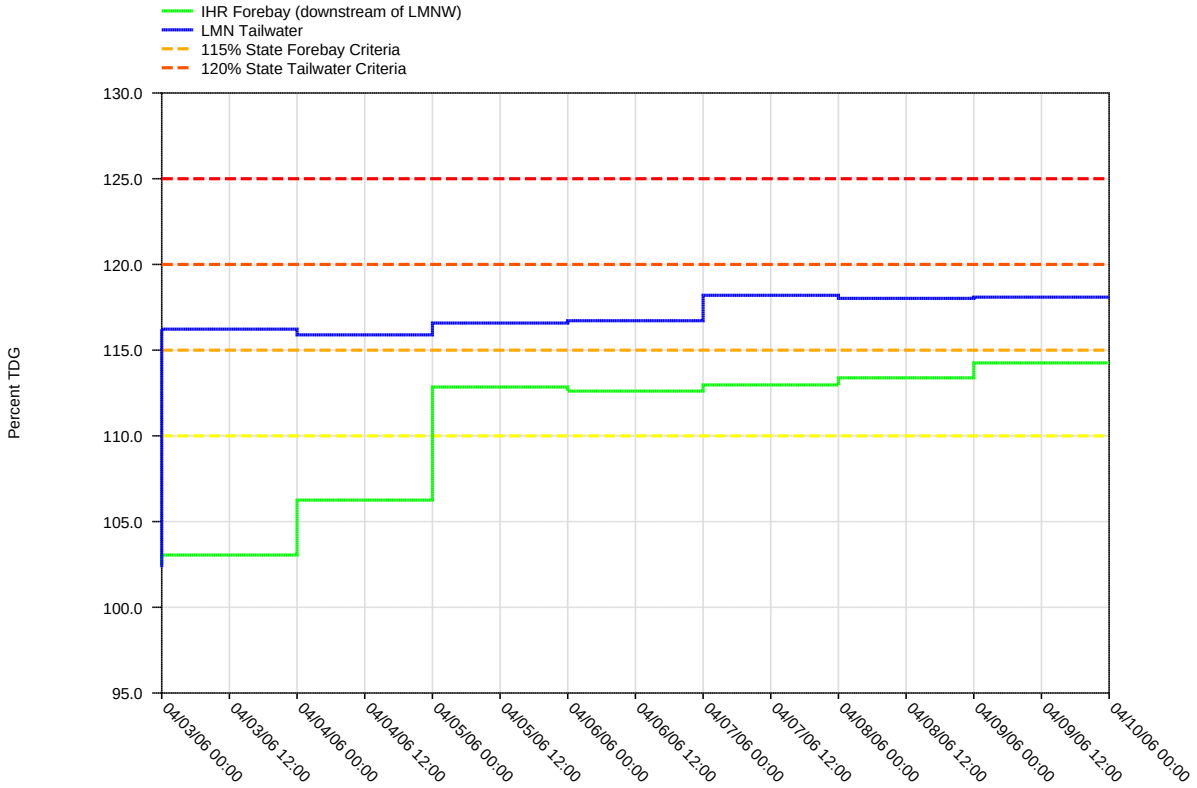


Figure 3.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

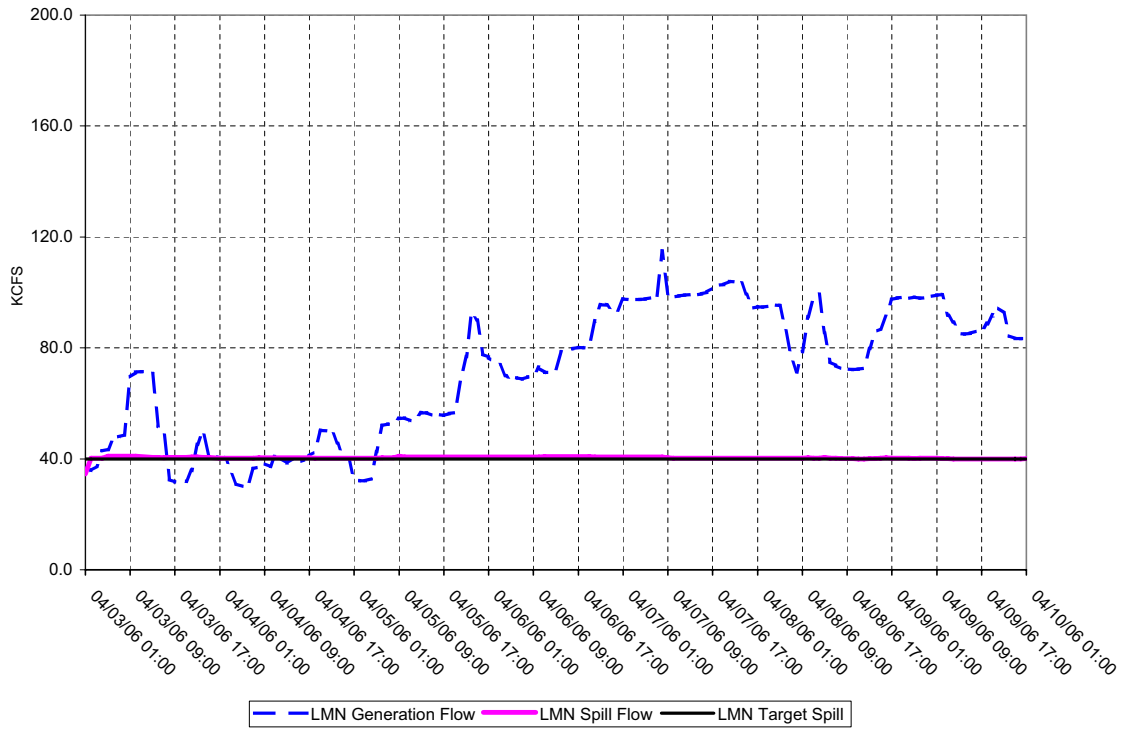
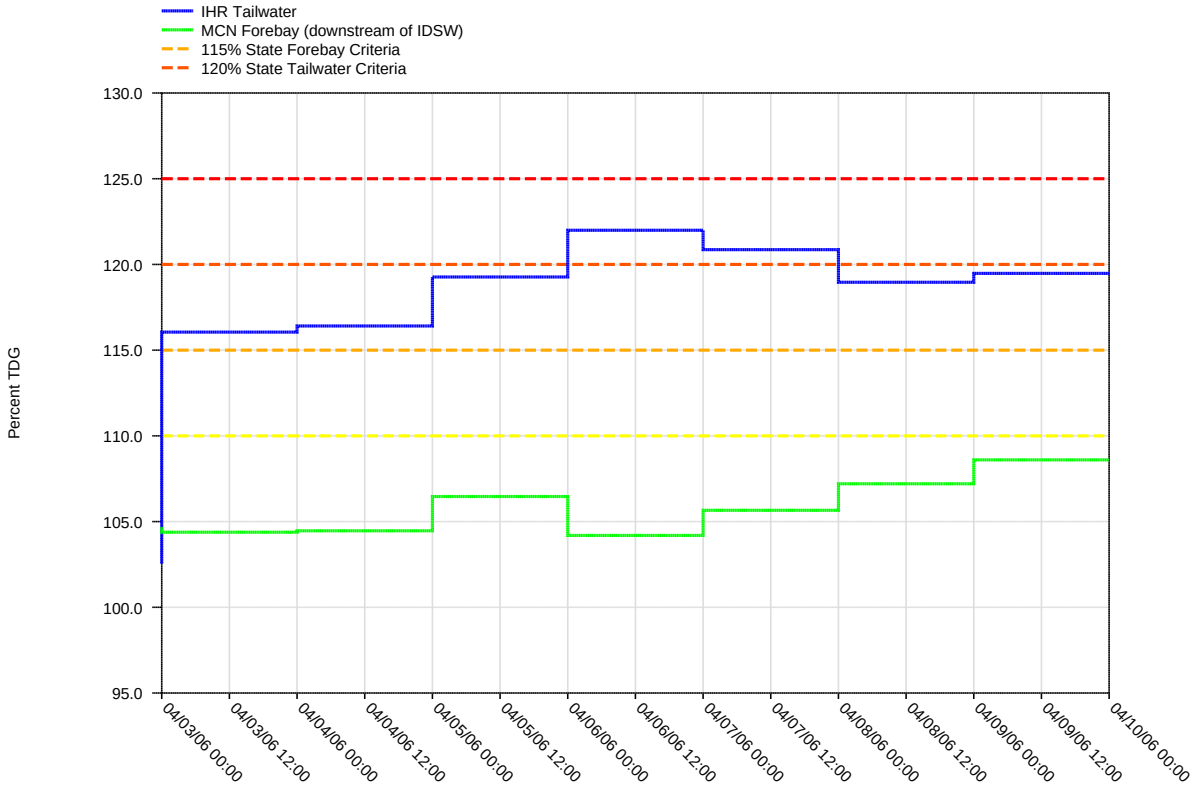


Figure 4.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

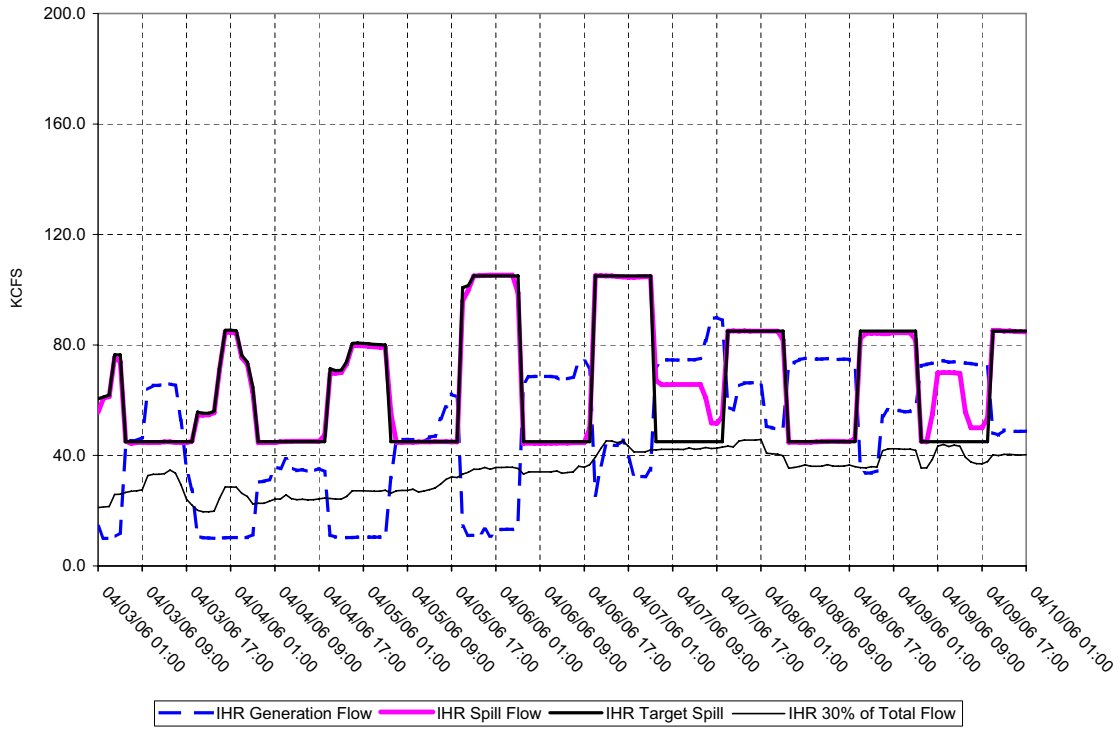
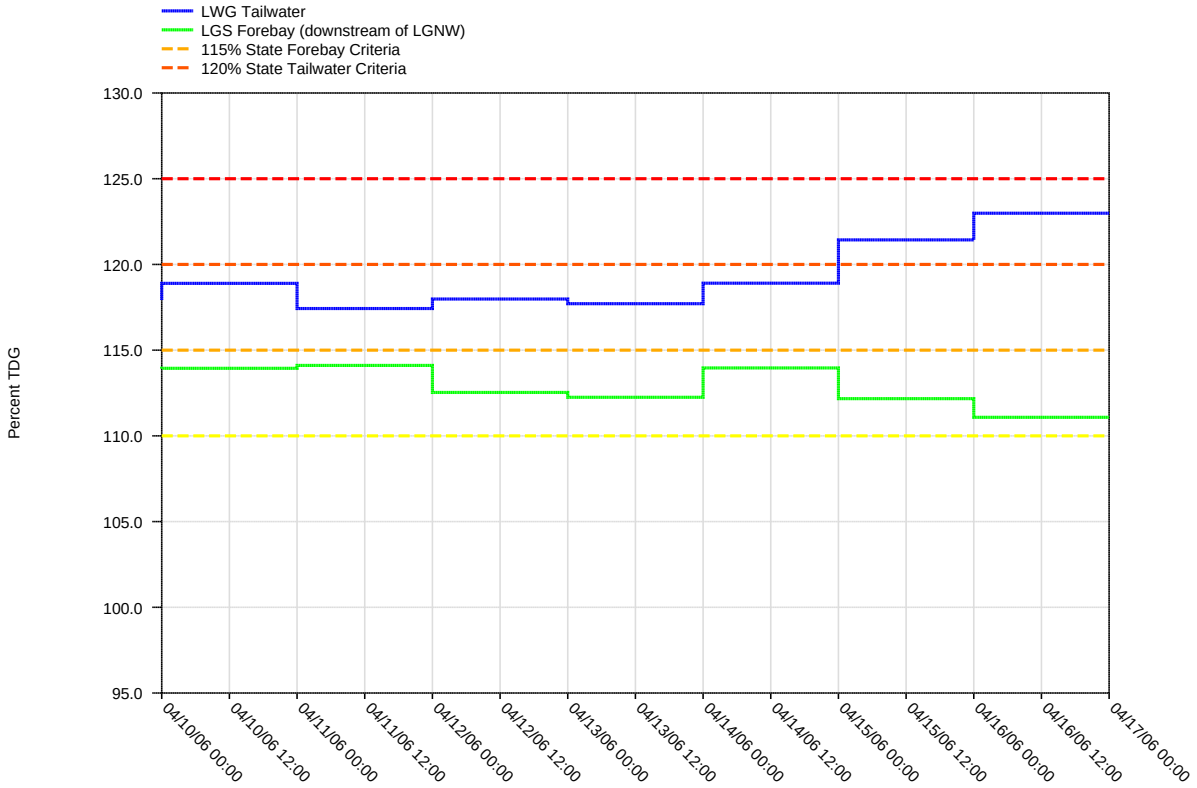


Figure 5.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

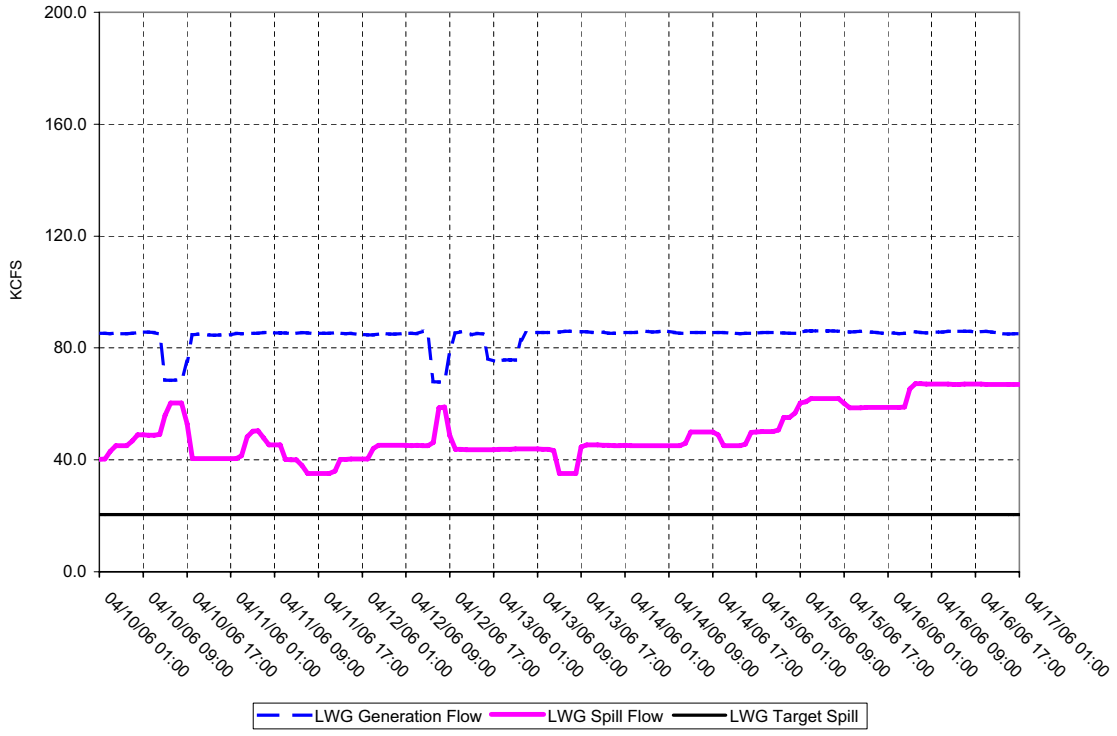
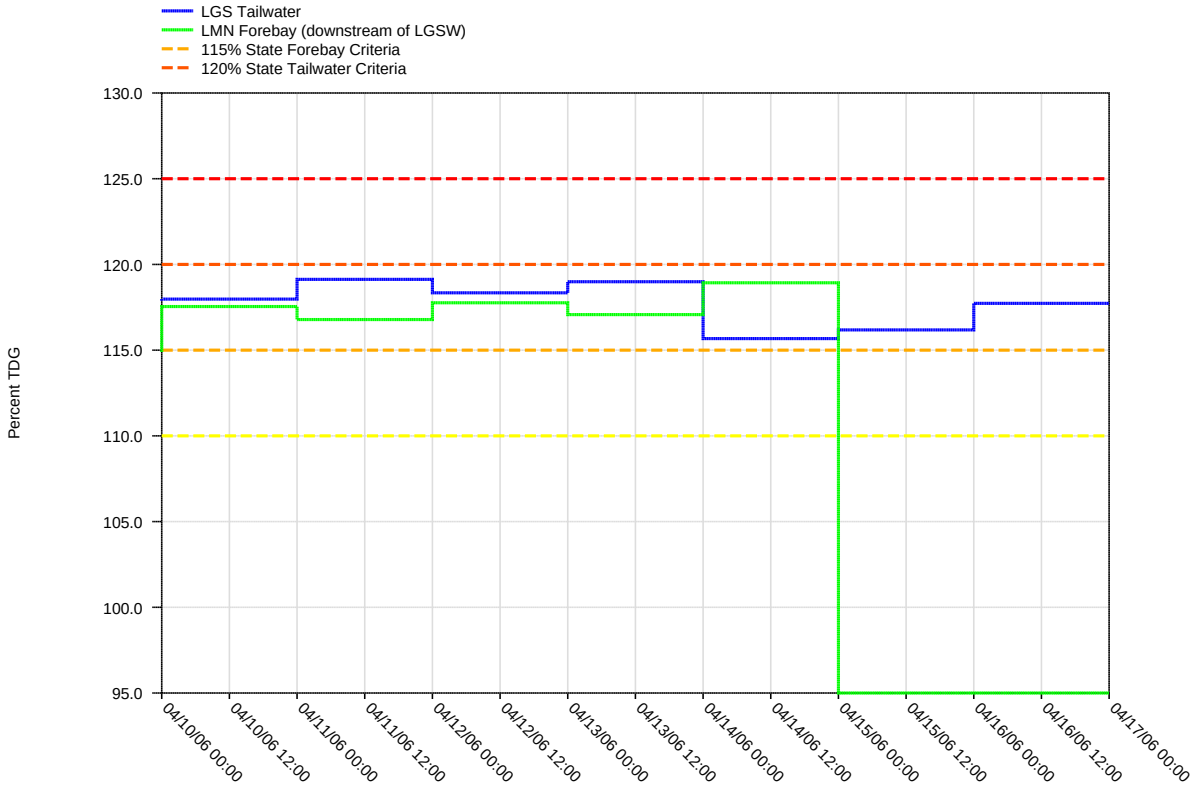


Figure 6.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

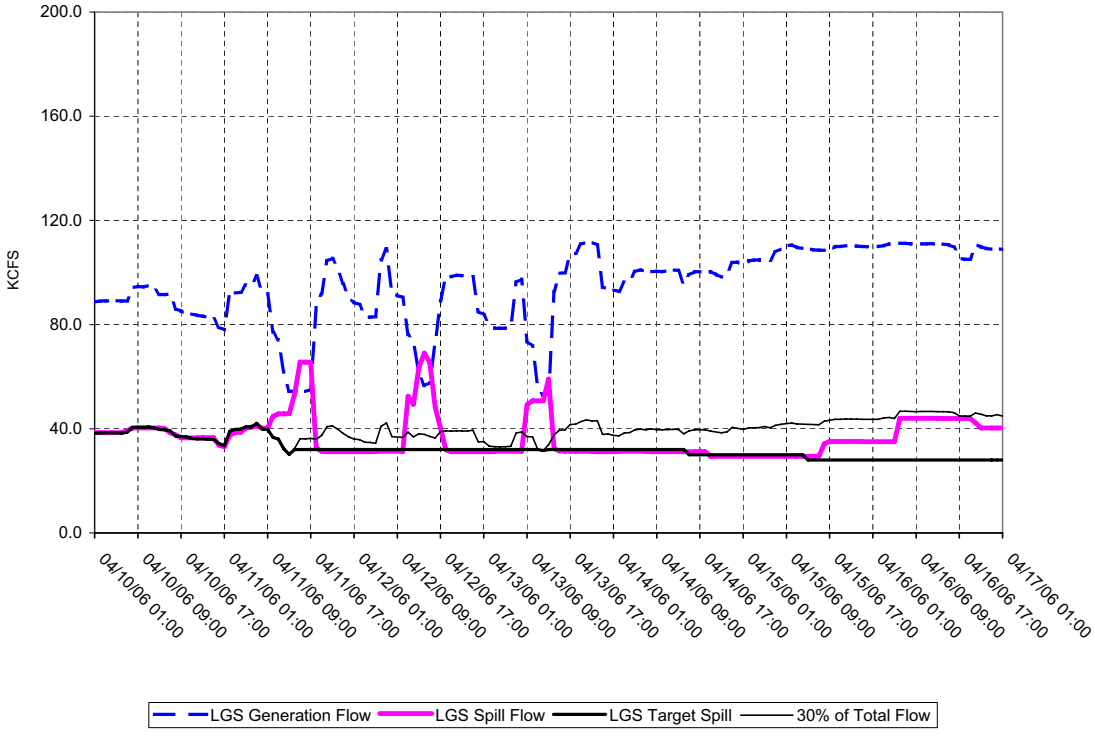
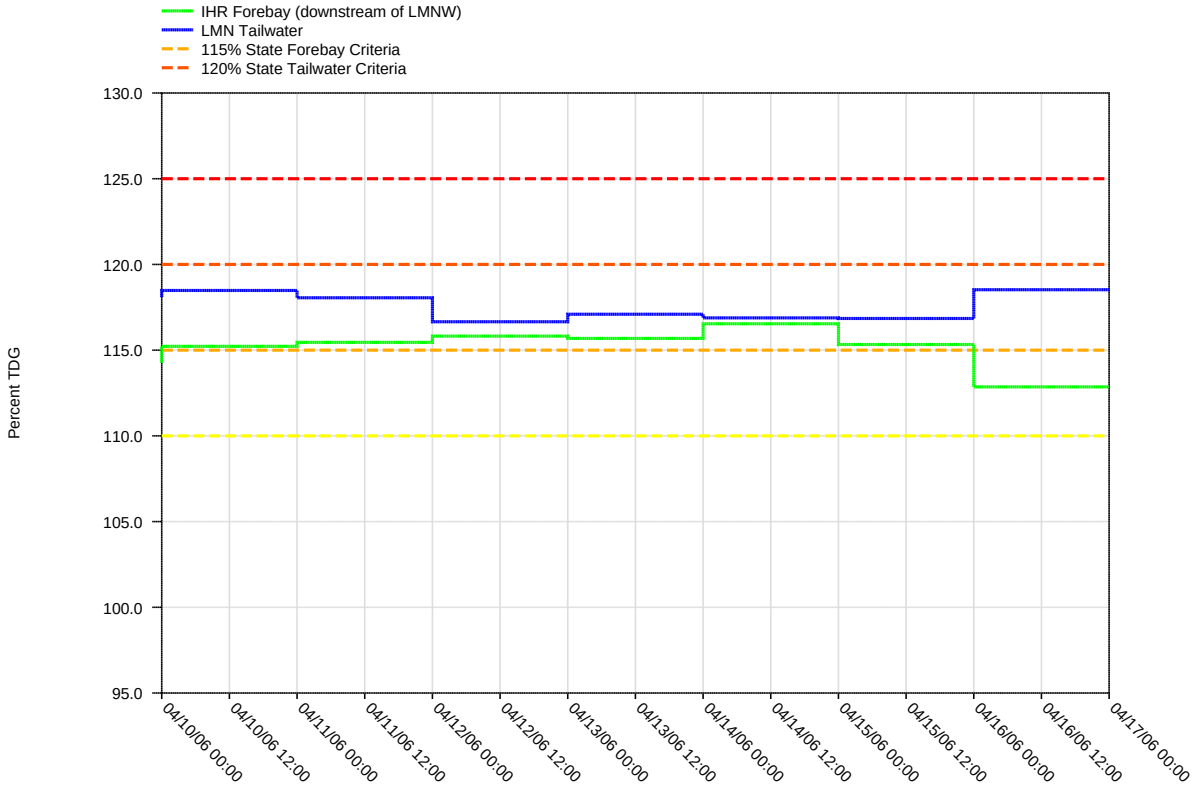


Figure 7.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

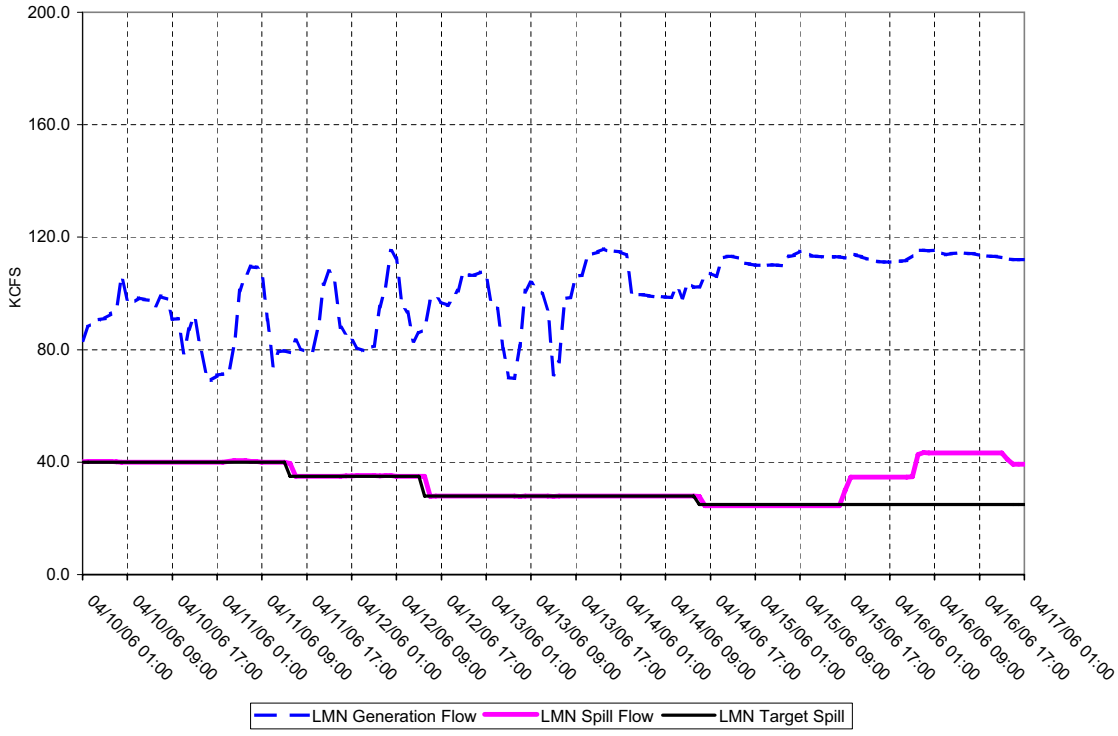
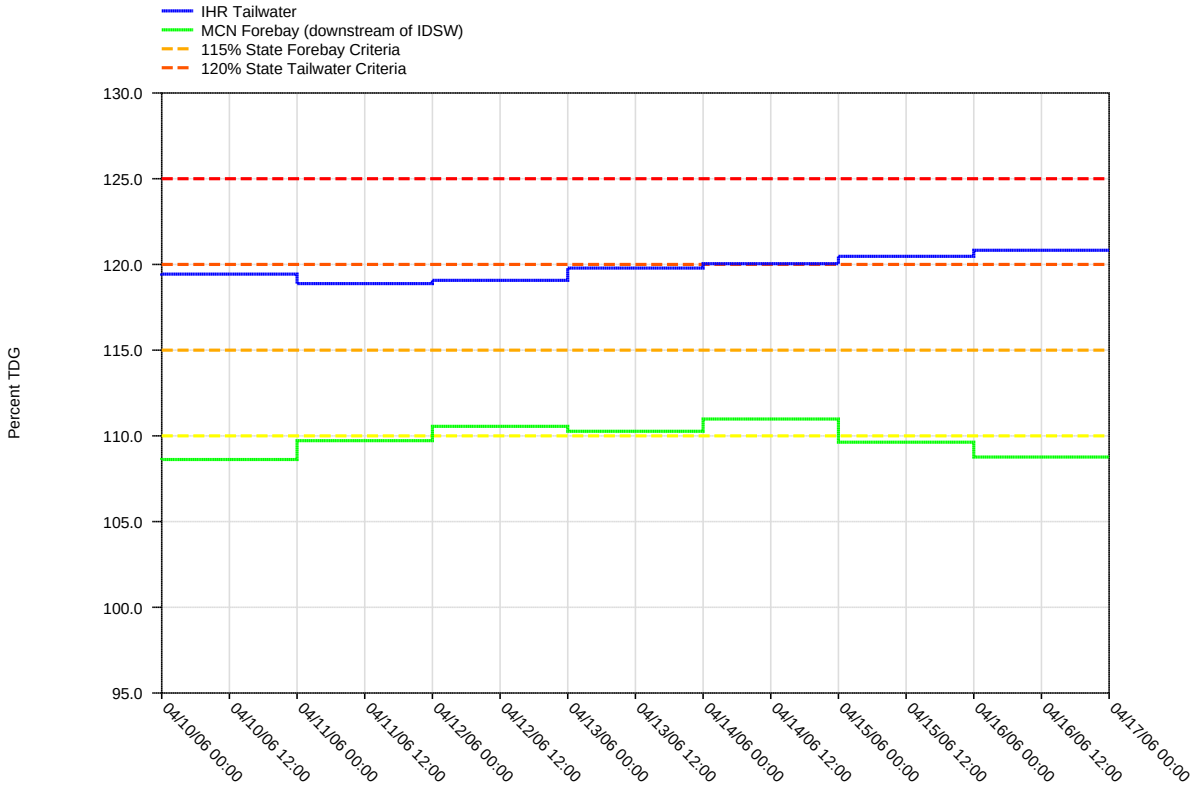


Figure 8.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

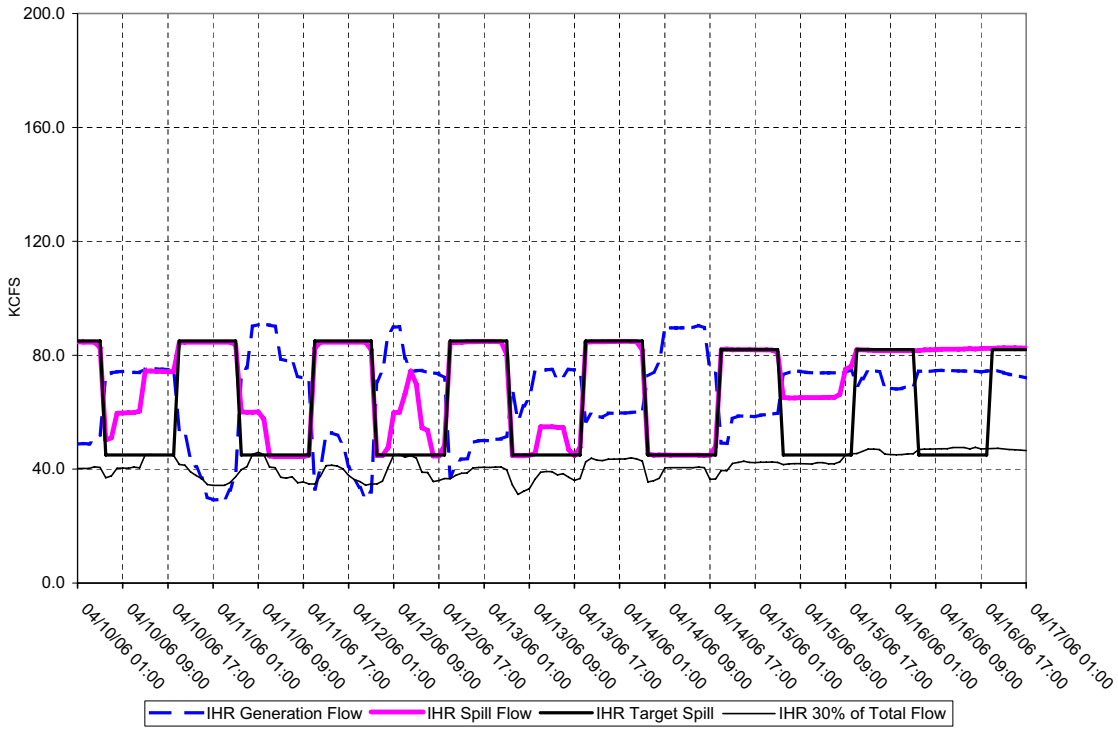
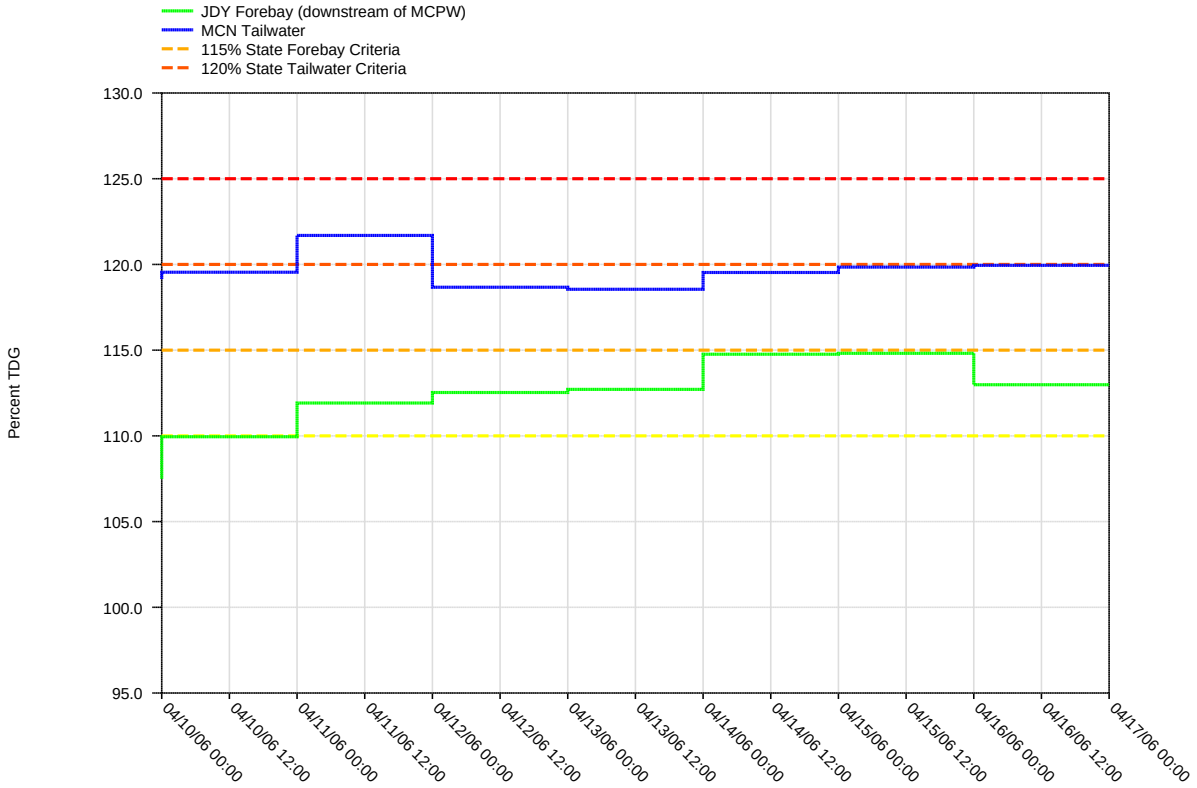


Figure 9.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

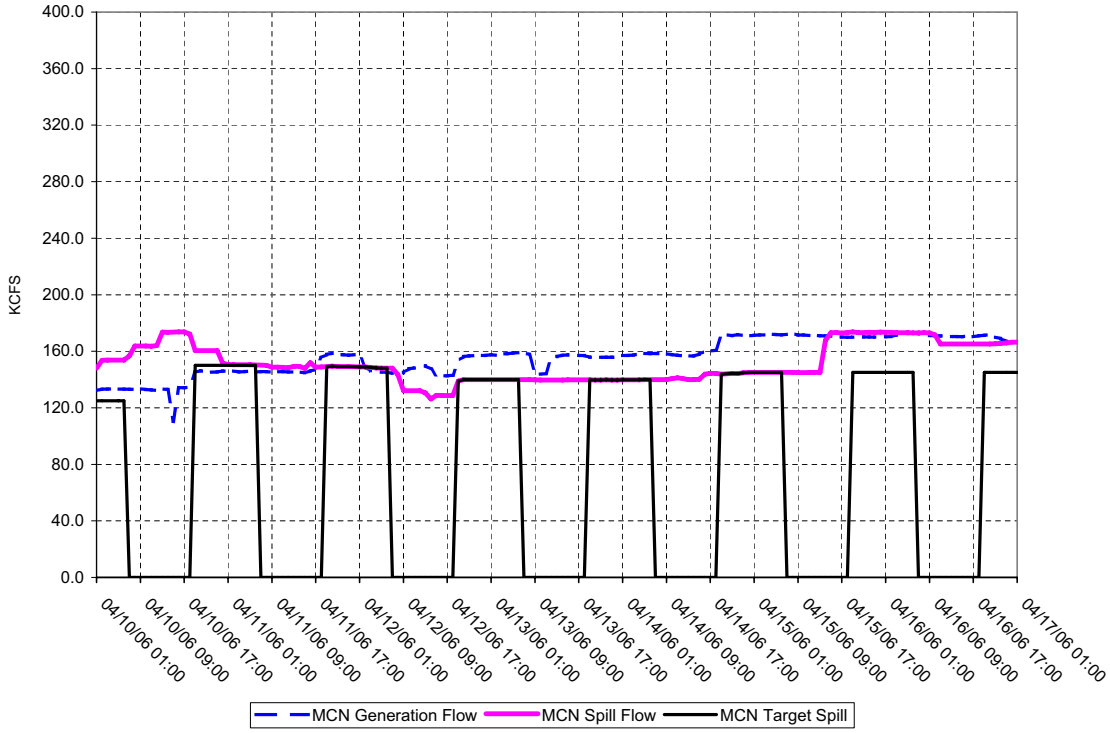
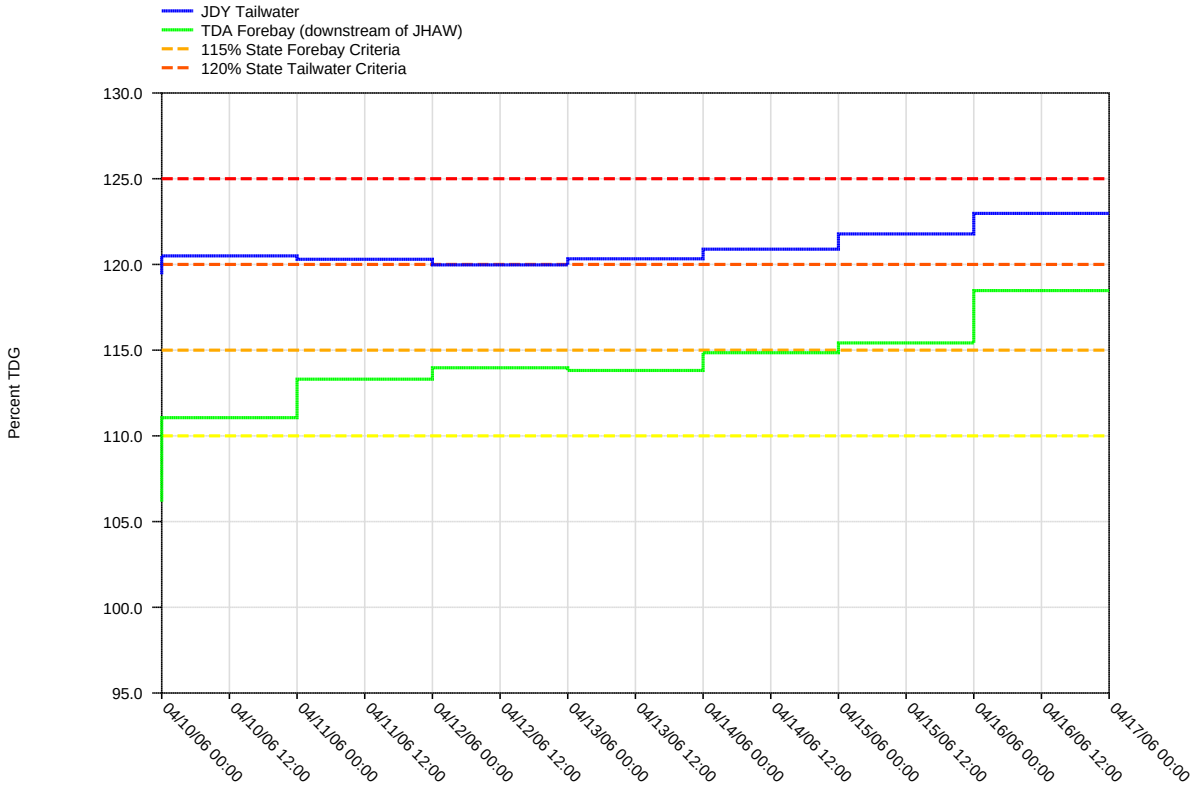


Figure 10.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

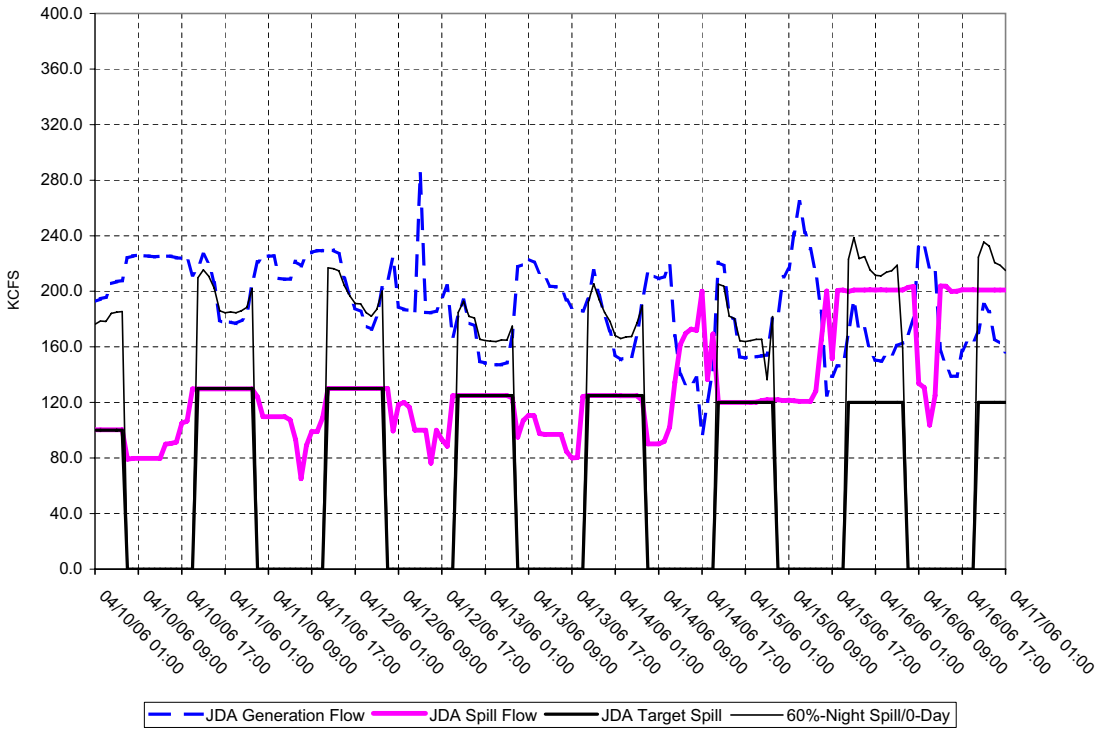
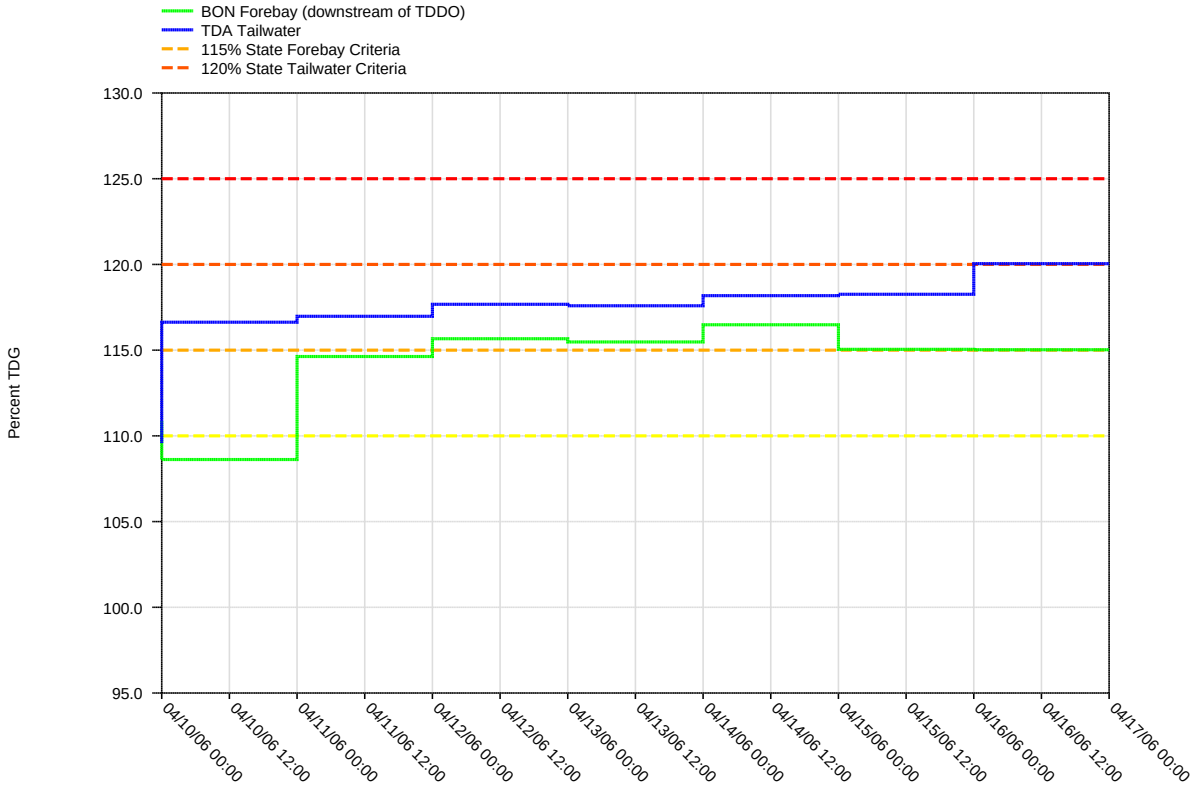


Figure 11.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

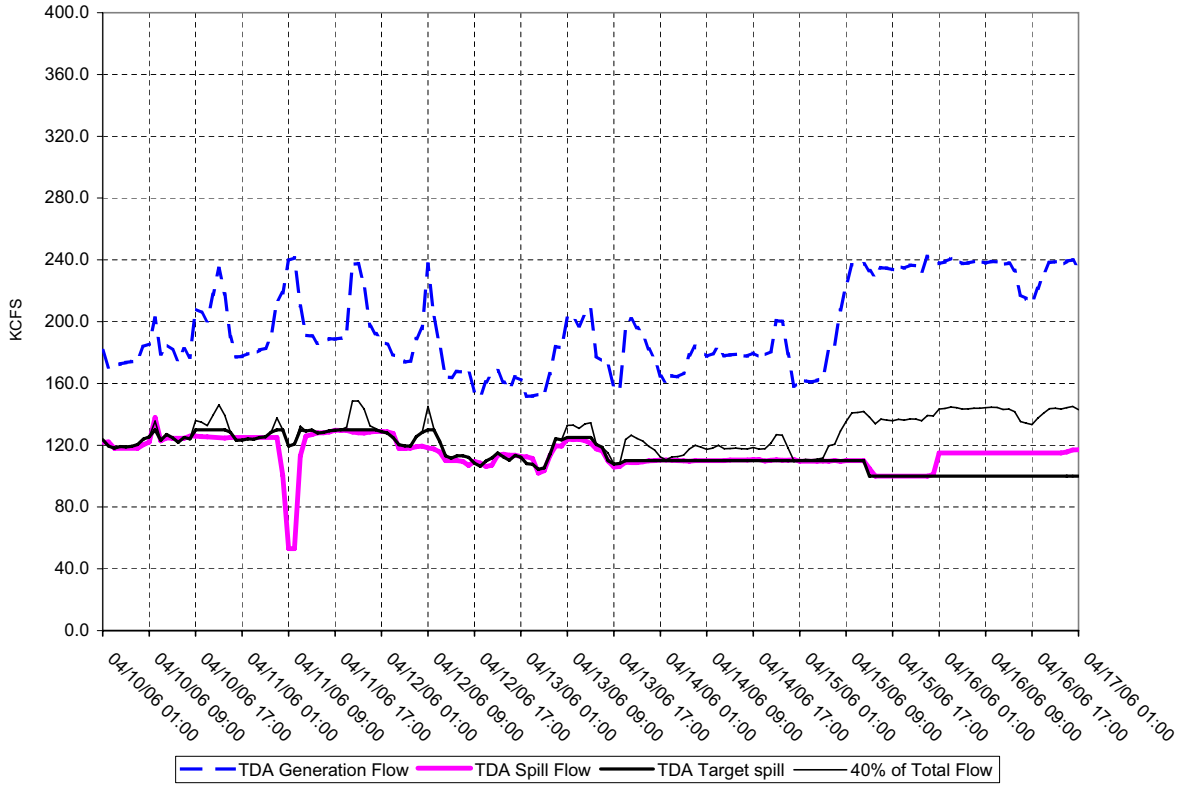
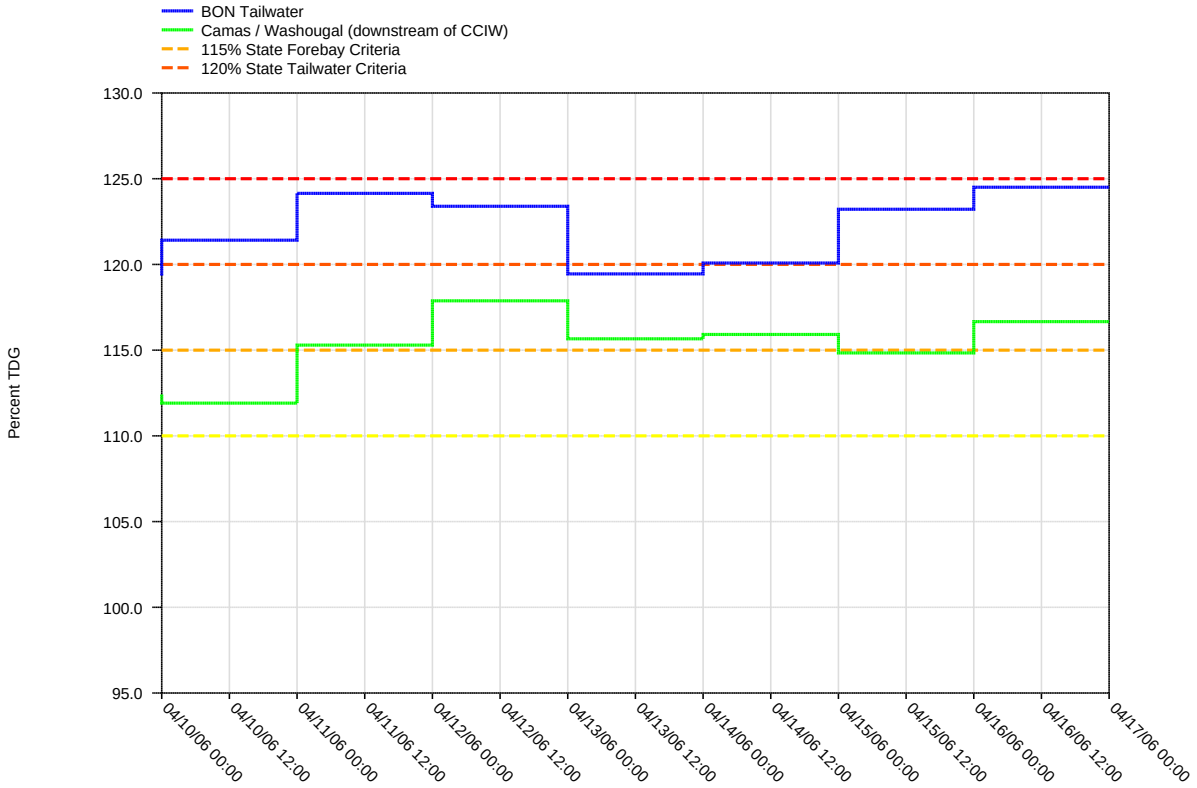


Figure 12.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

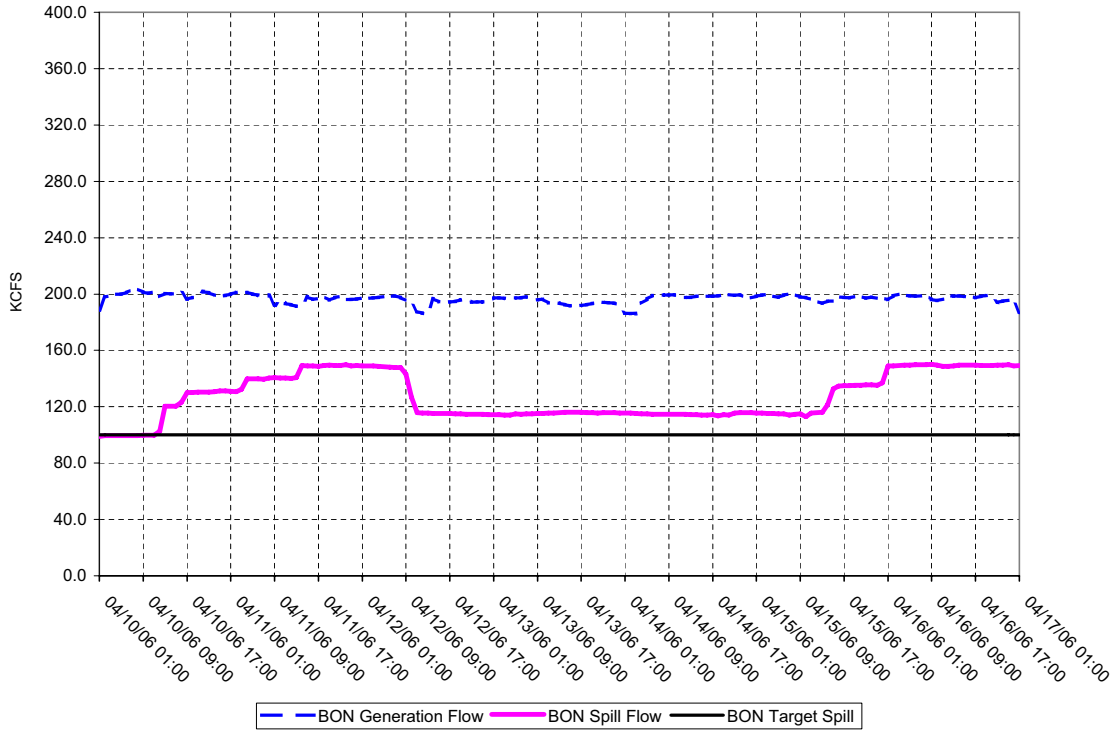
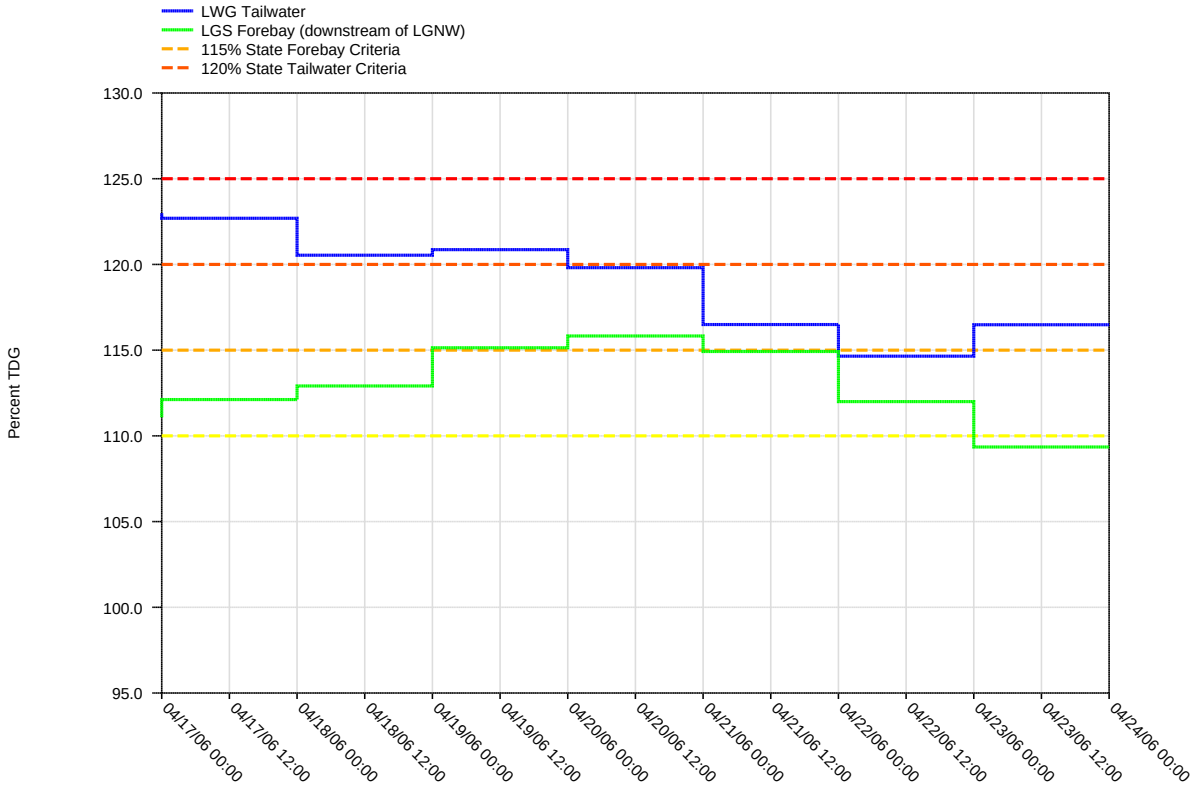


Figure 13.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

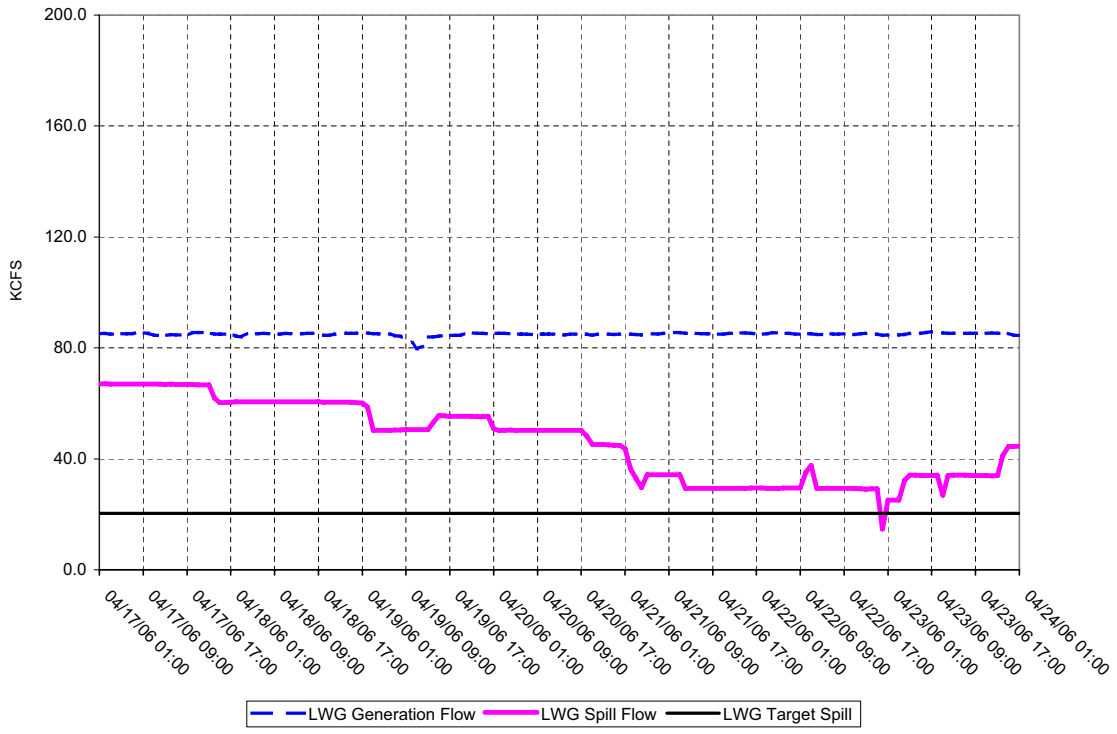
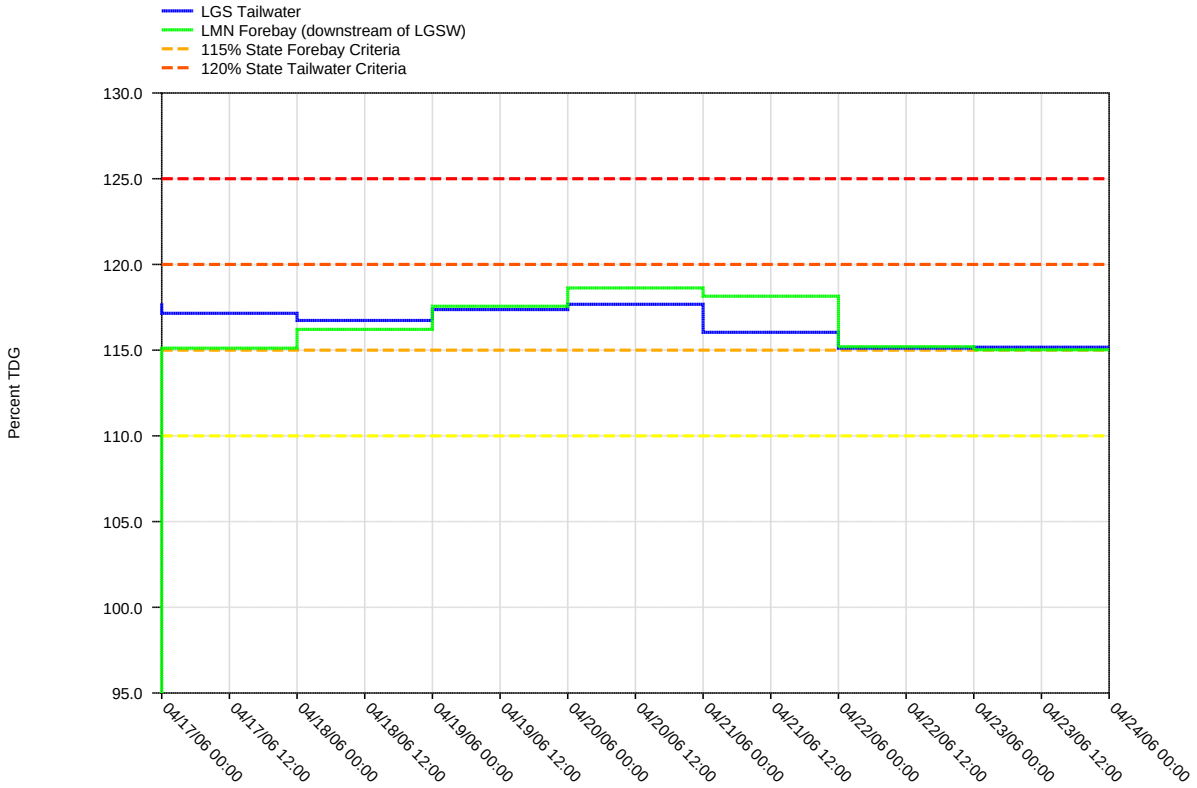


Figure 14.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

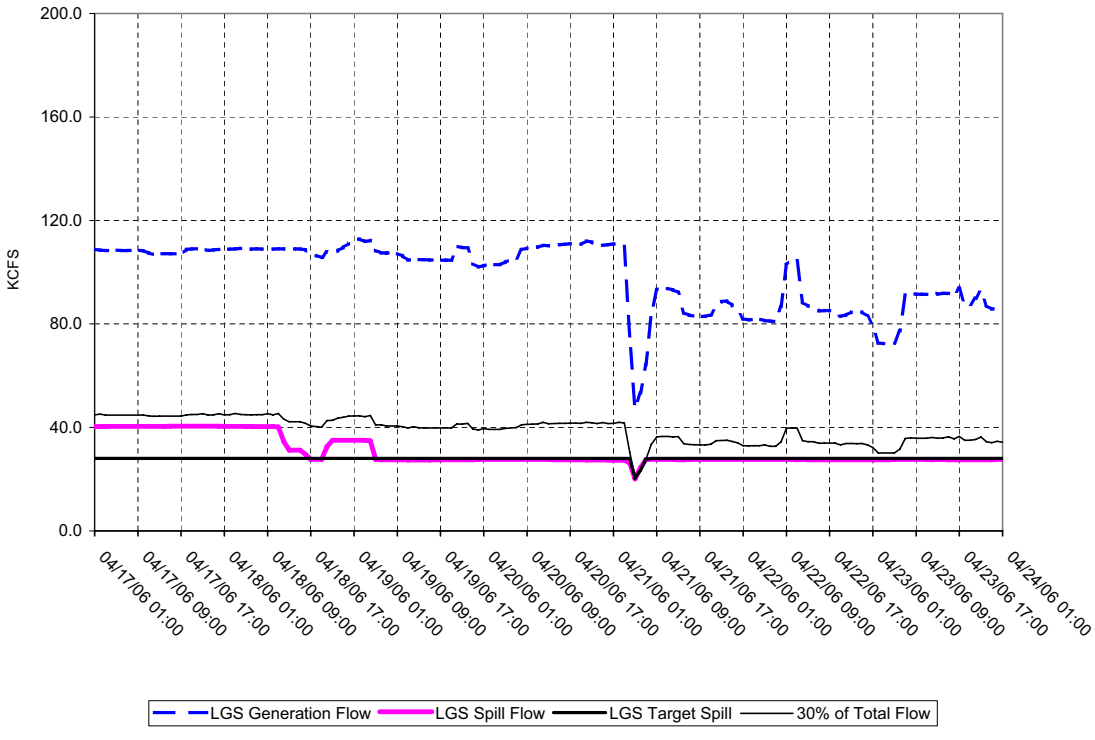
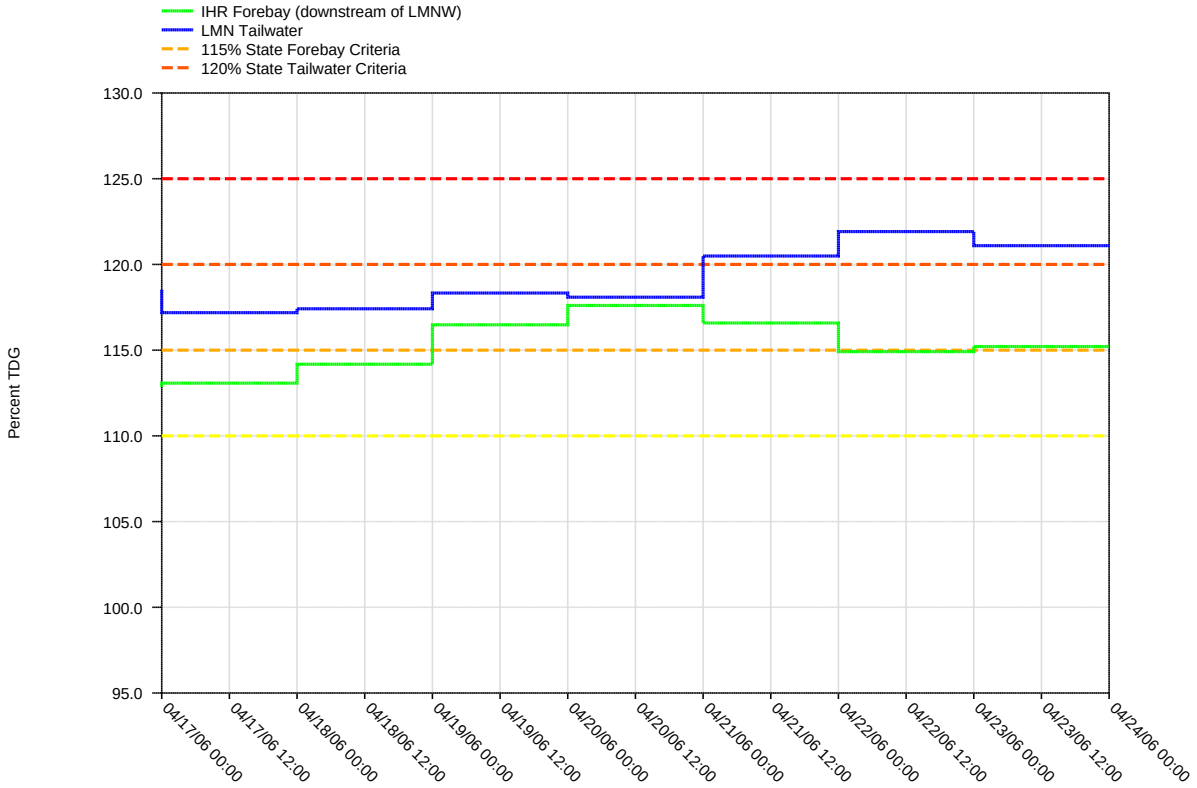


Figure 15.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

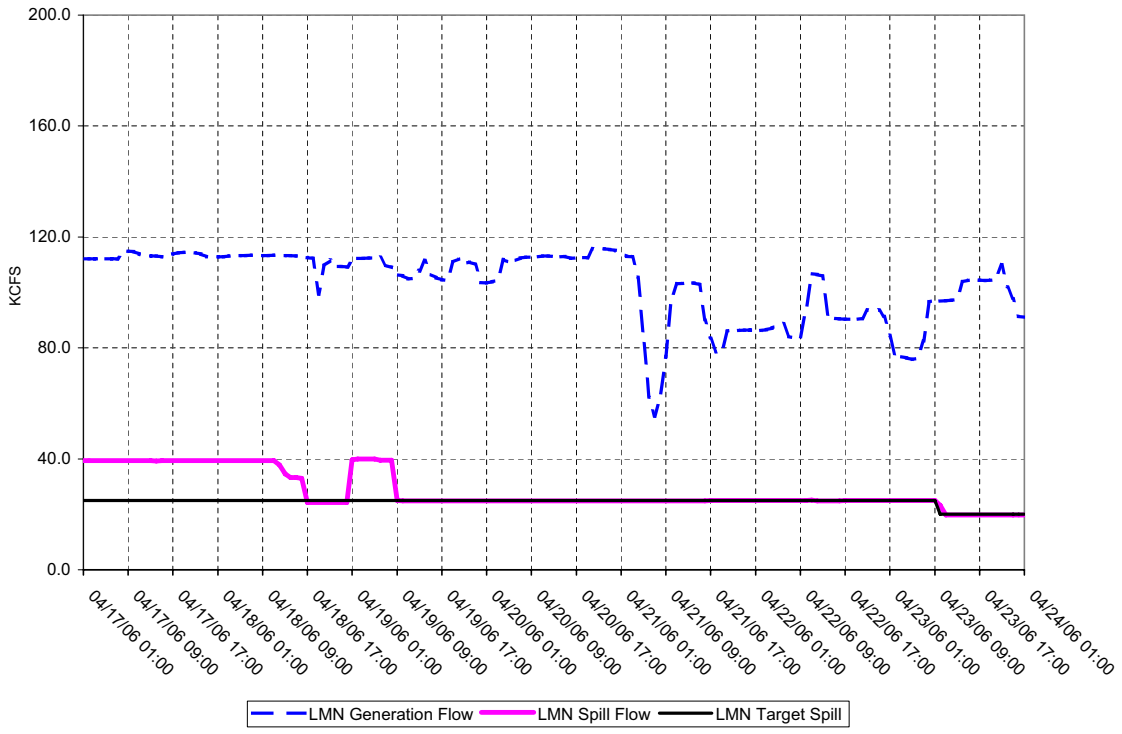
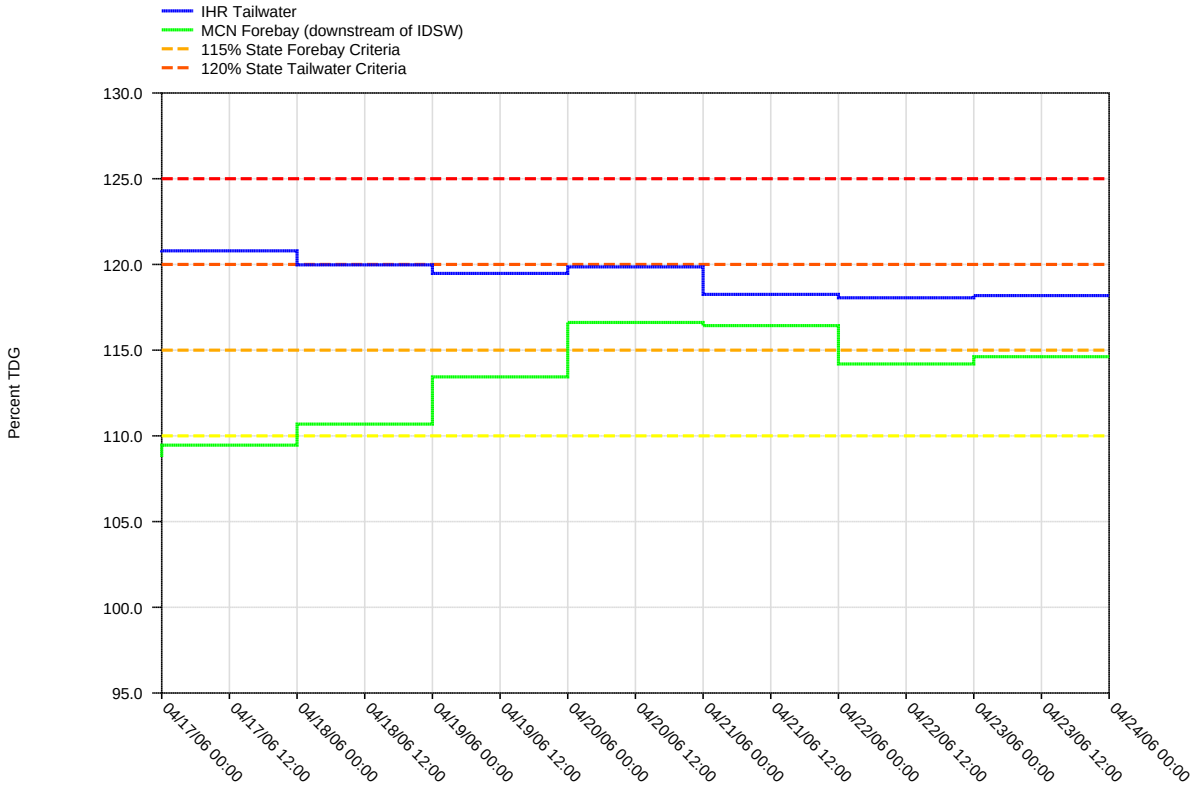


Figure 16.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

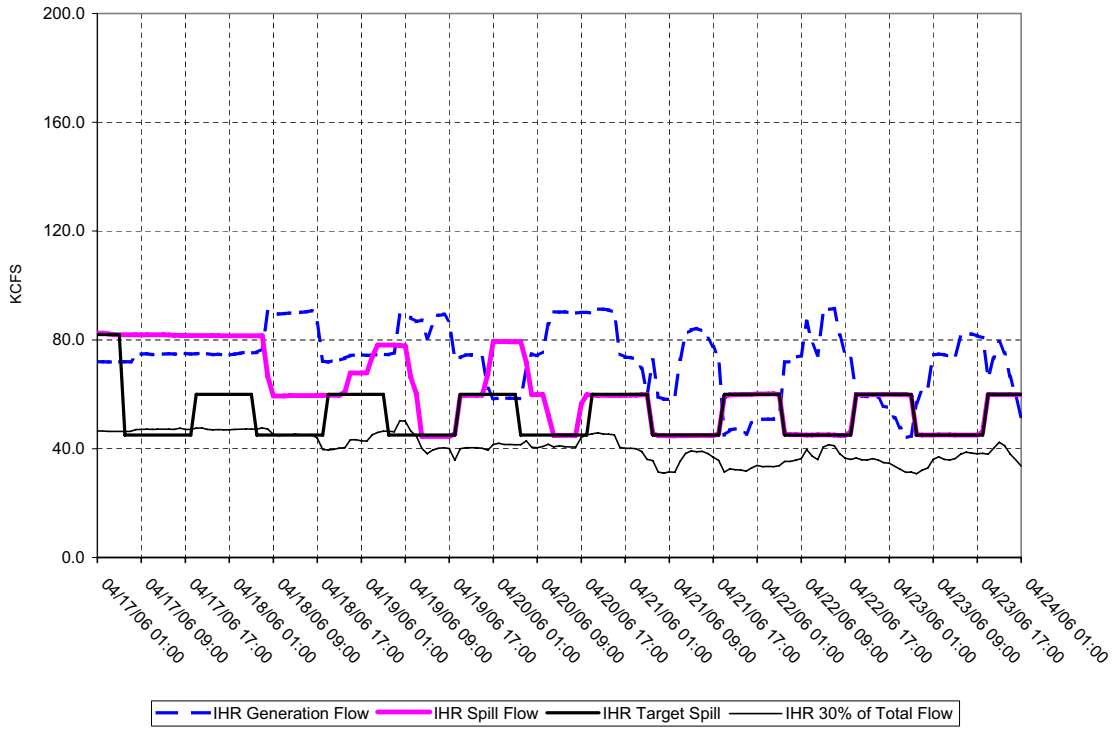
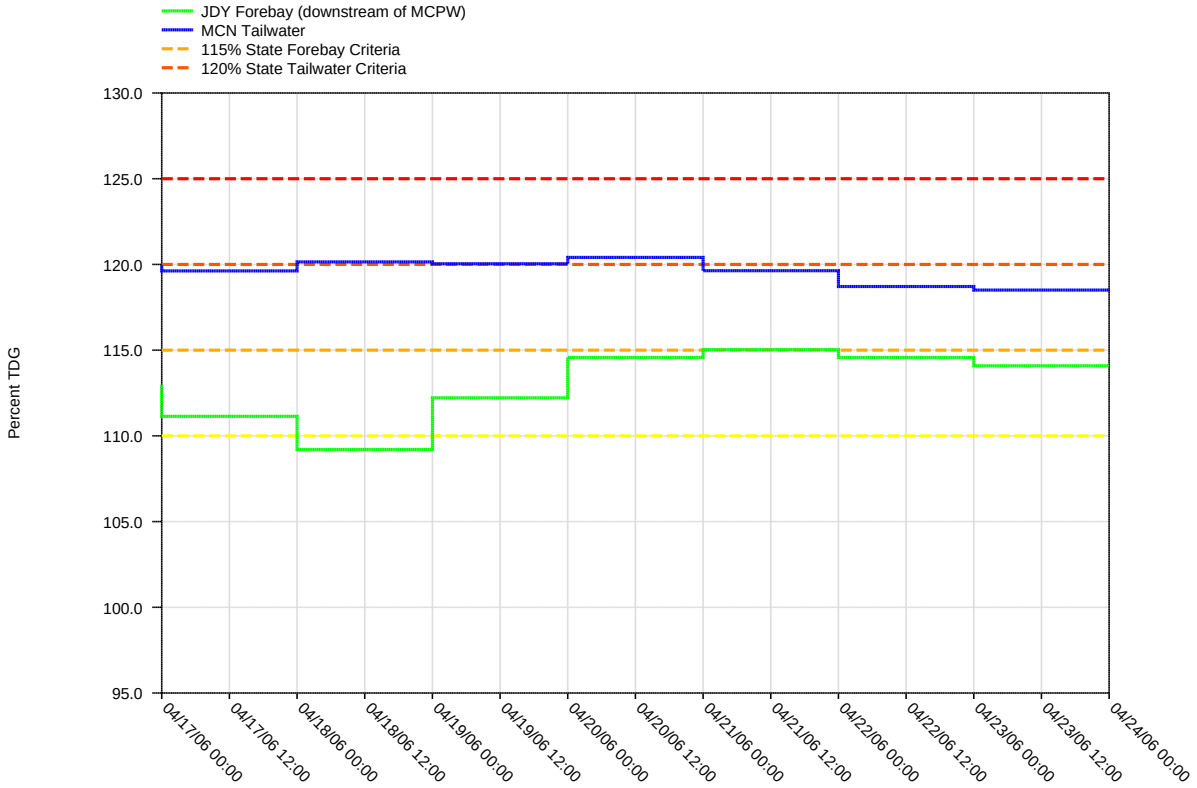


Figure 17.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

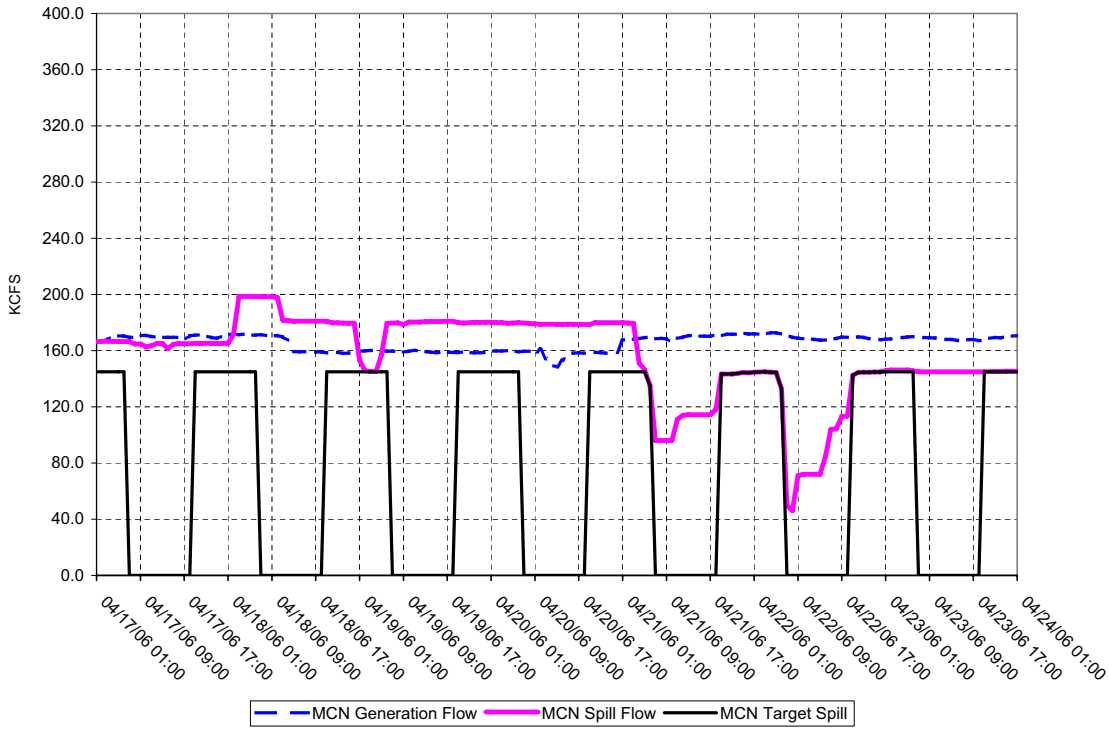
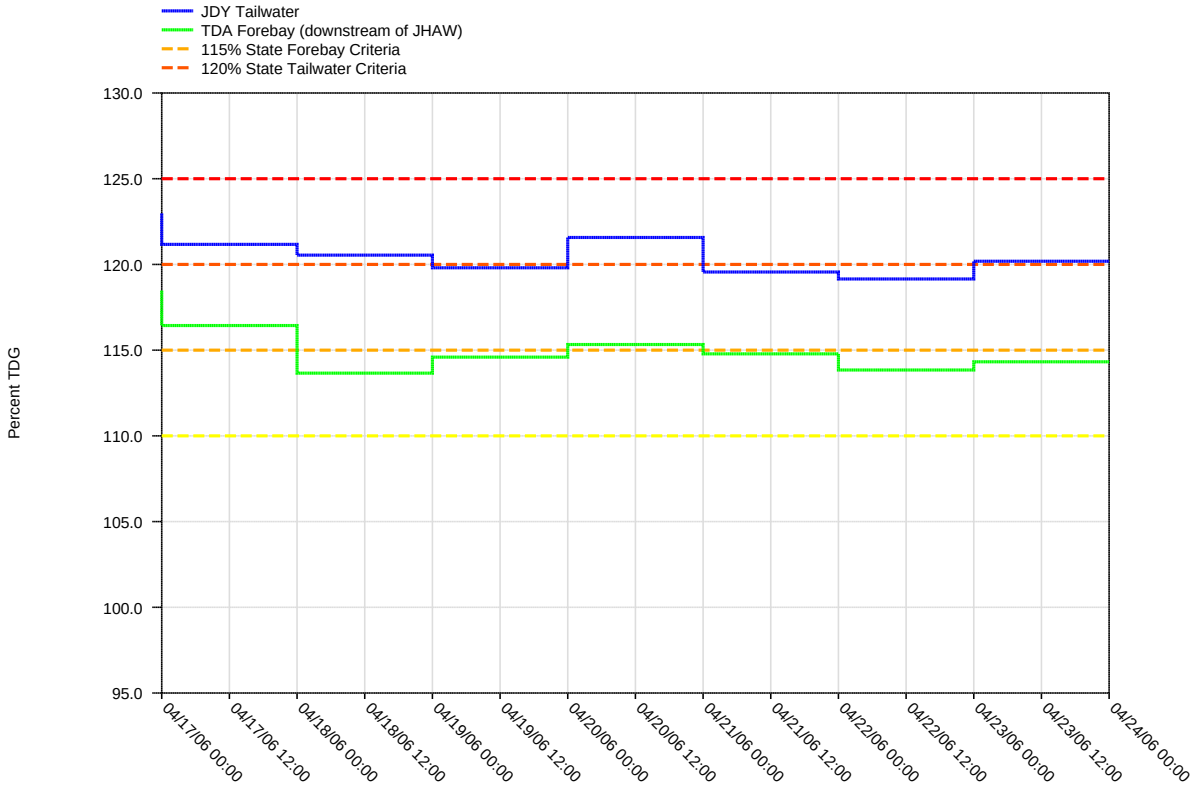


Figure 18.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

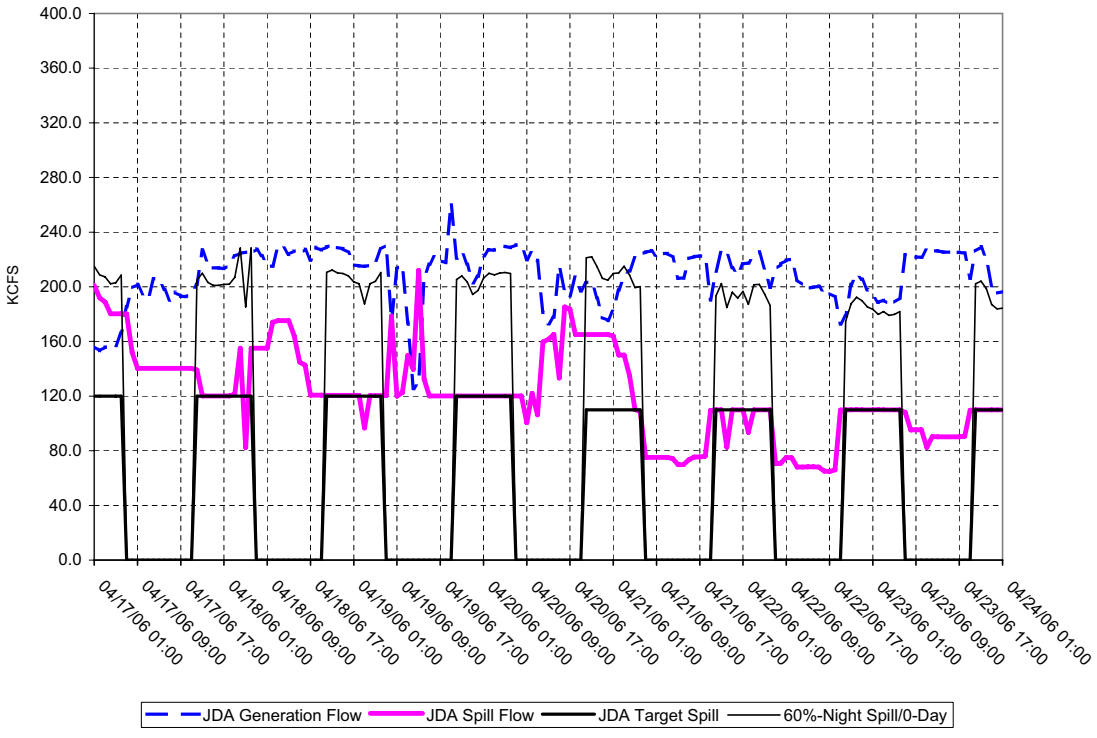
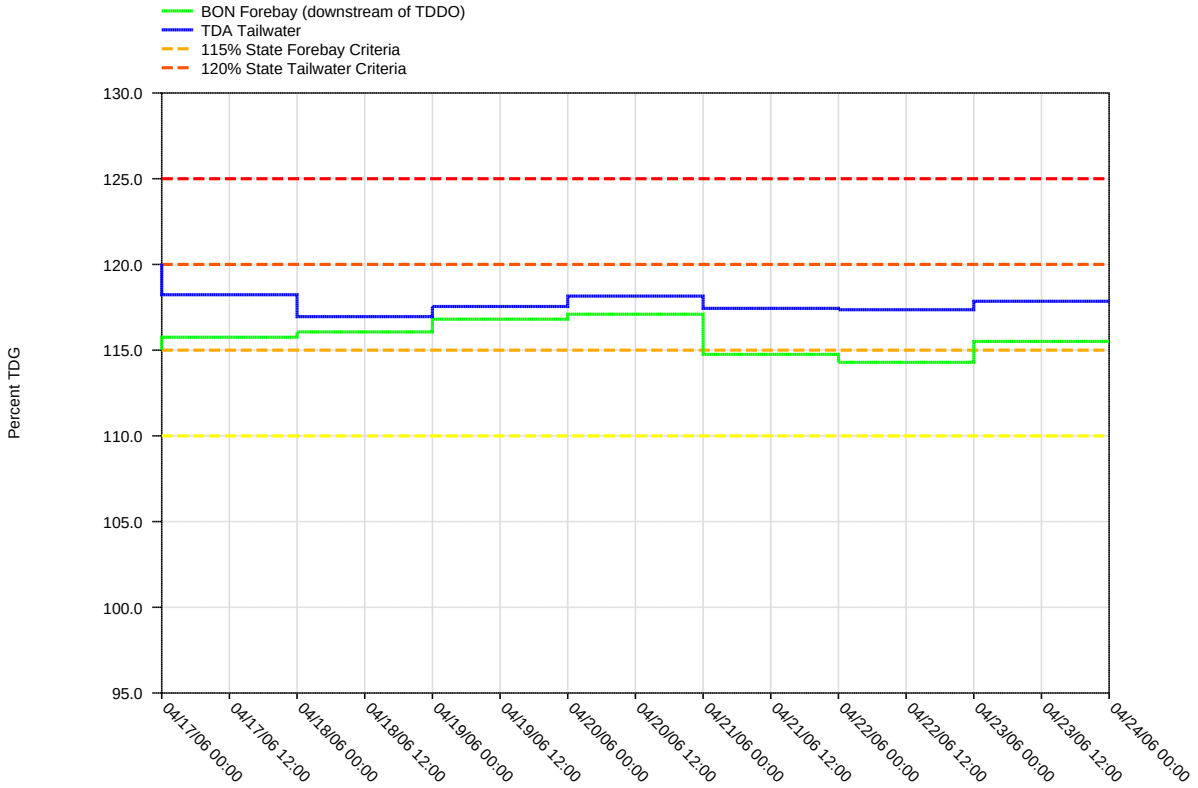


Figure 19.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

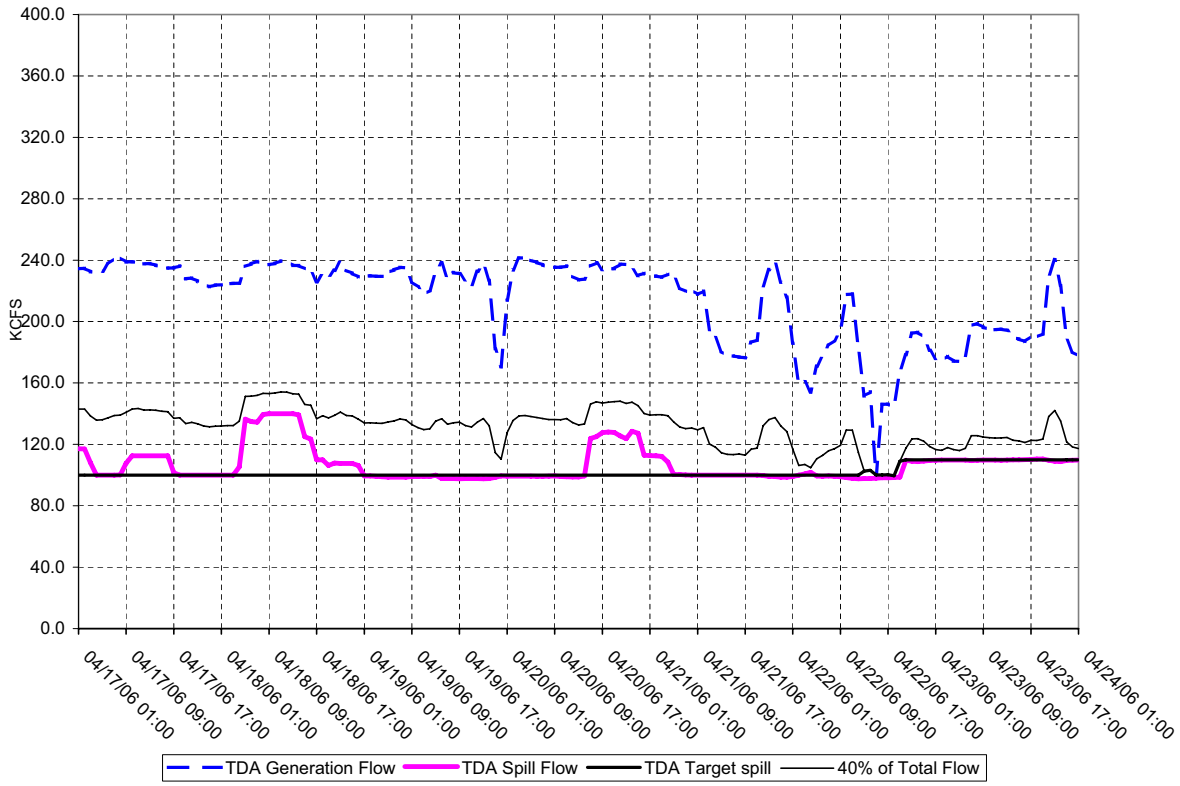
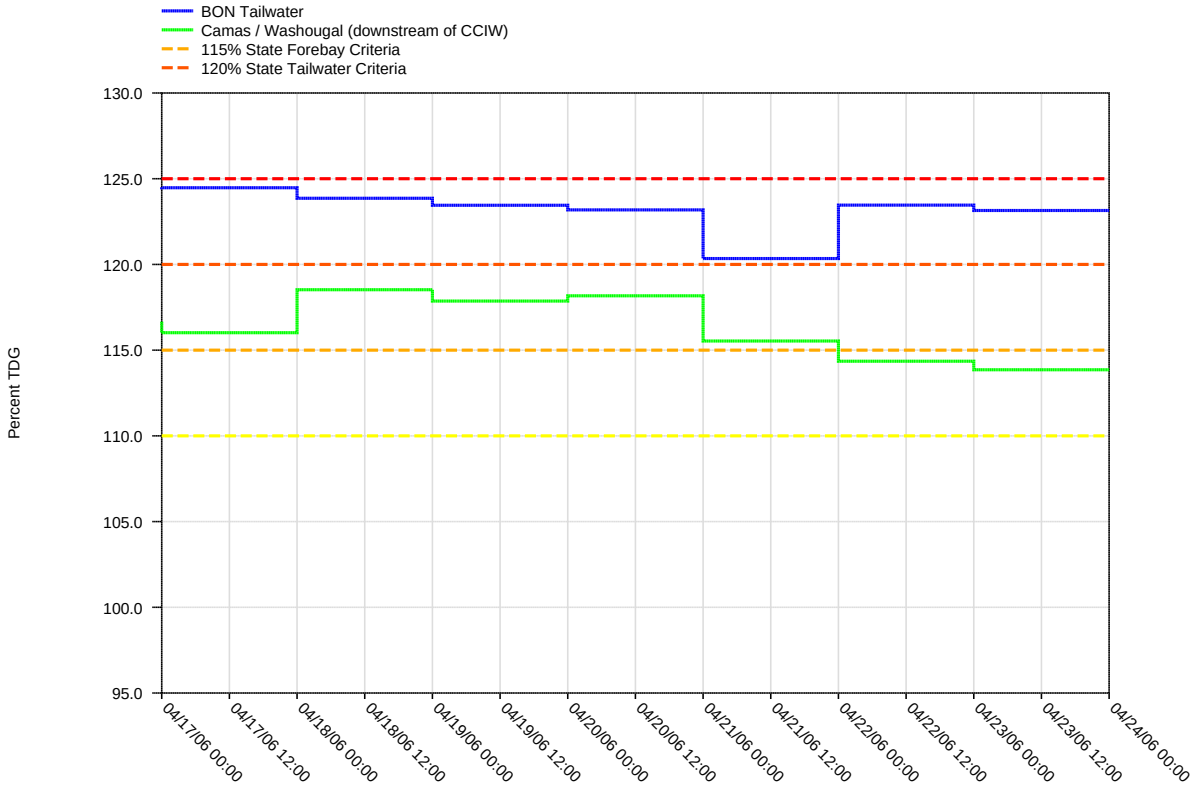


Figure 20.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

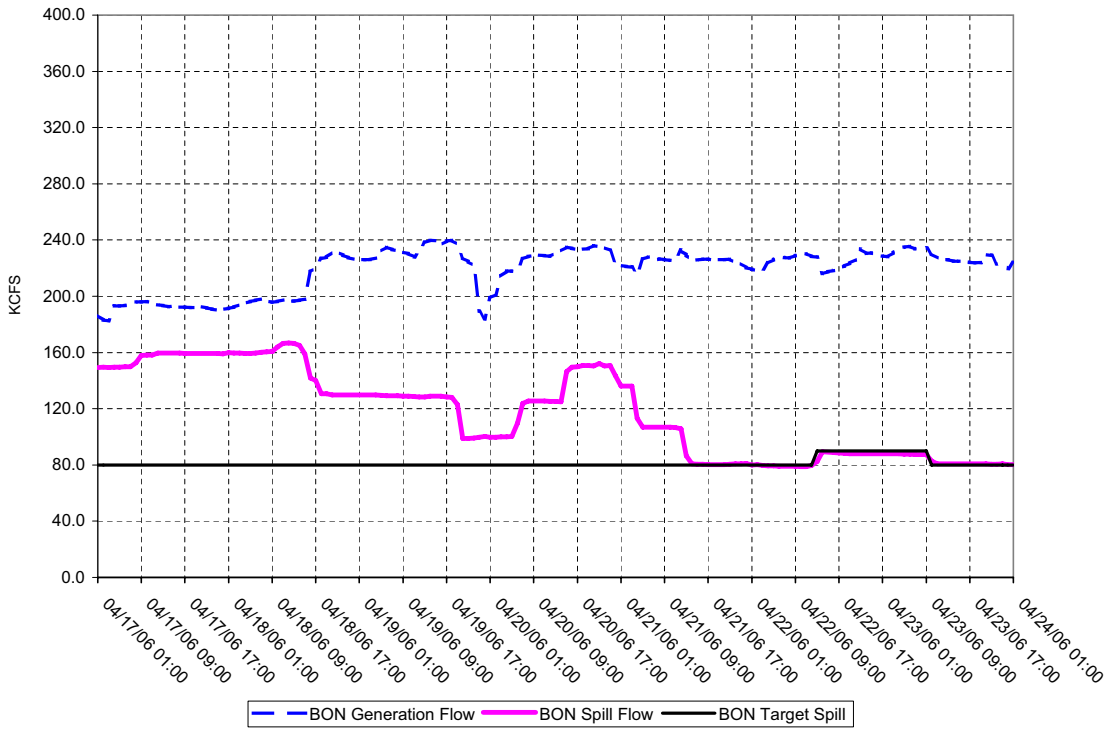
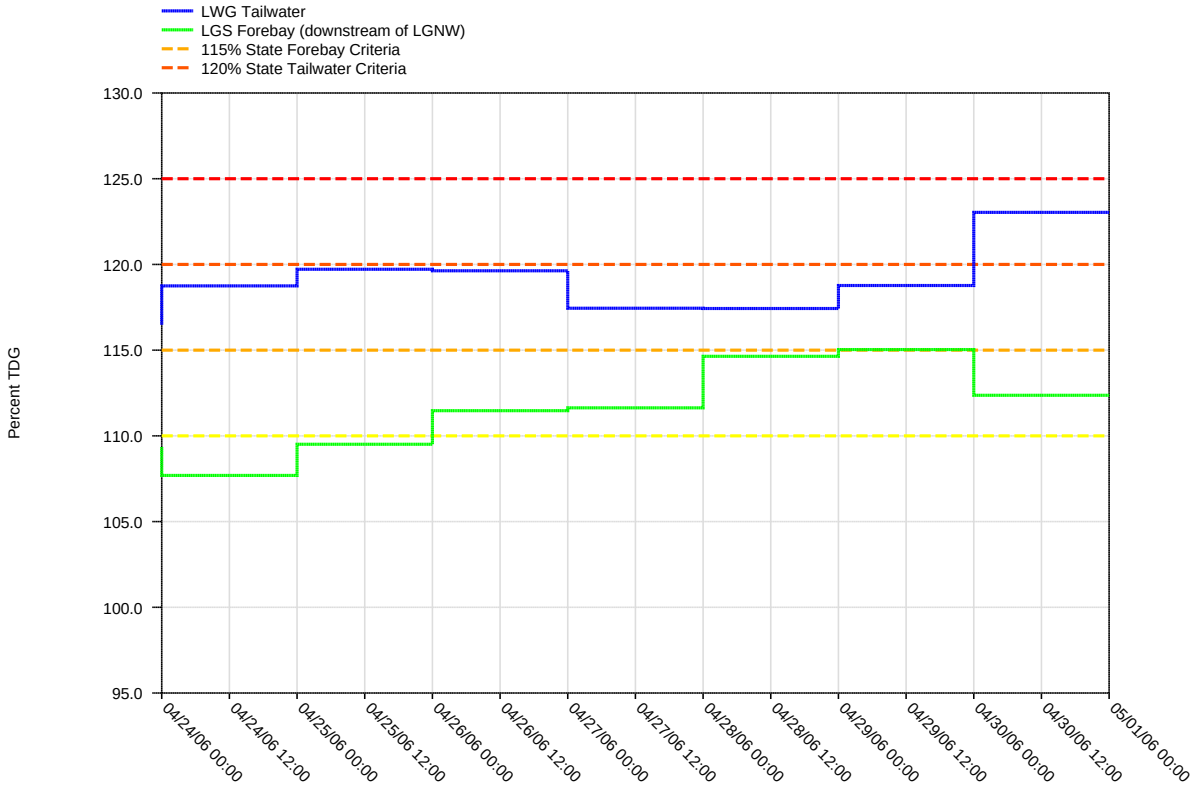


Figure 21.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

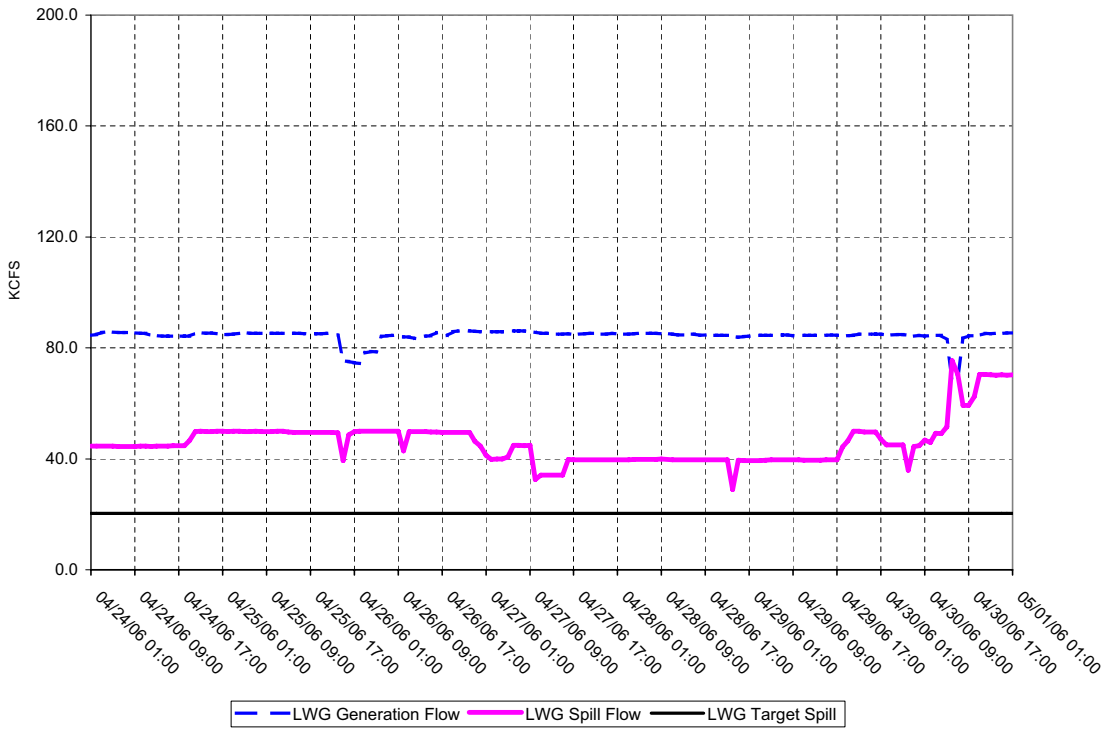
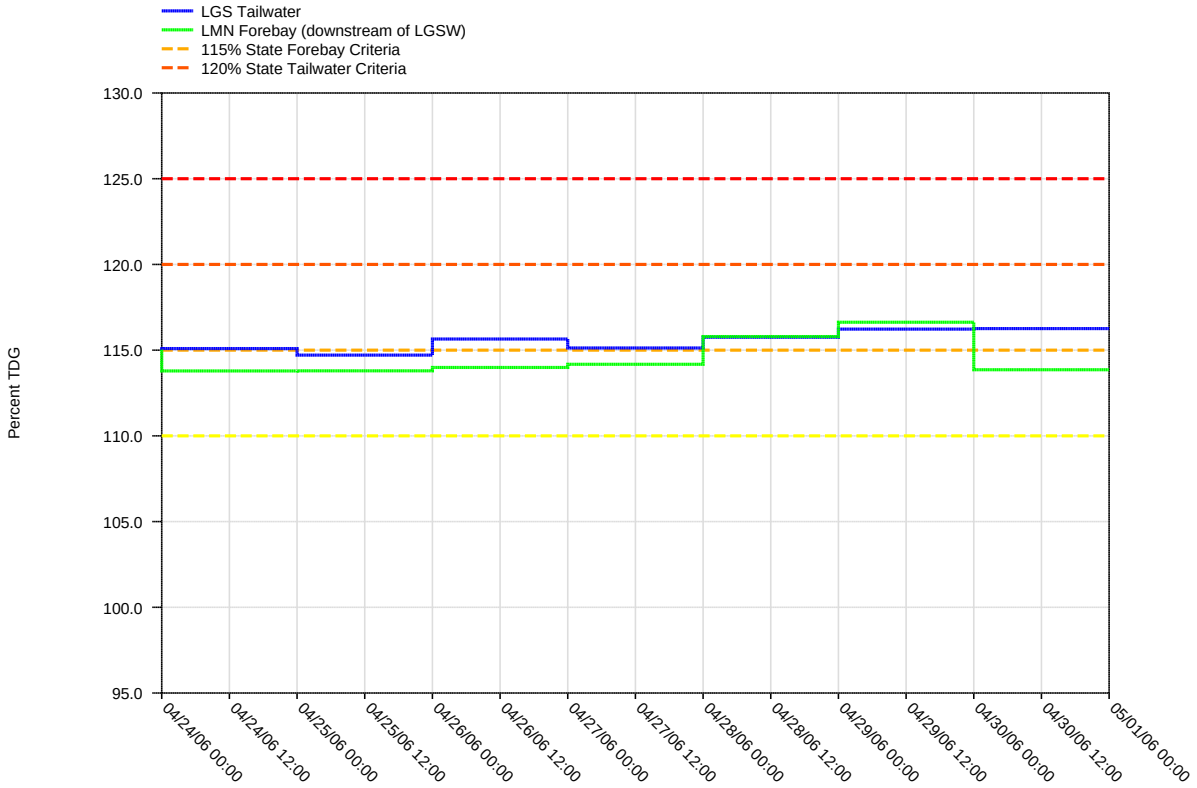


Figure 22.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

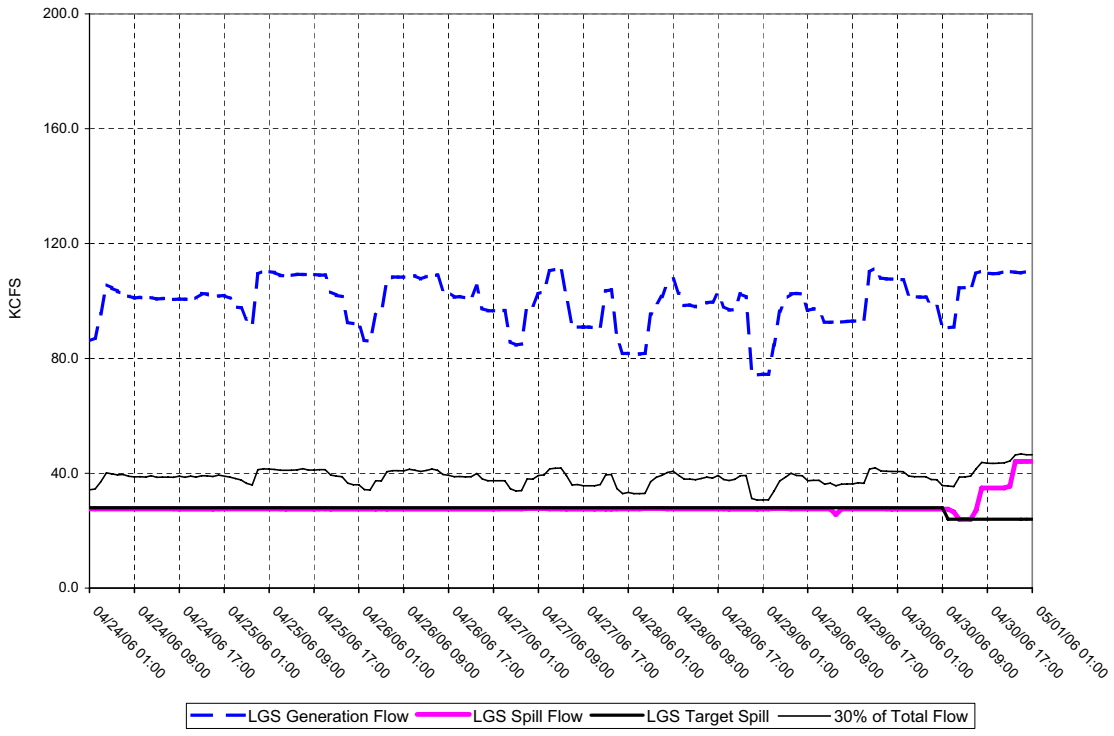
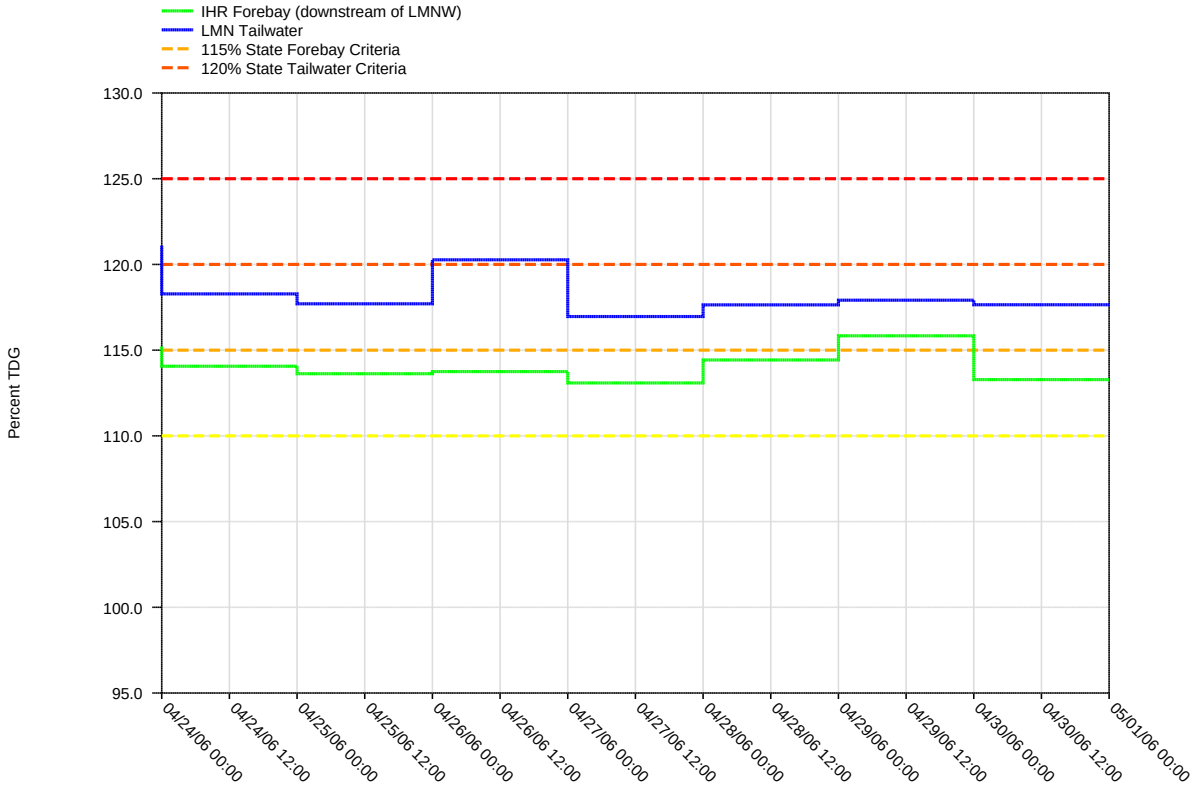


Figure 23.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

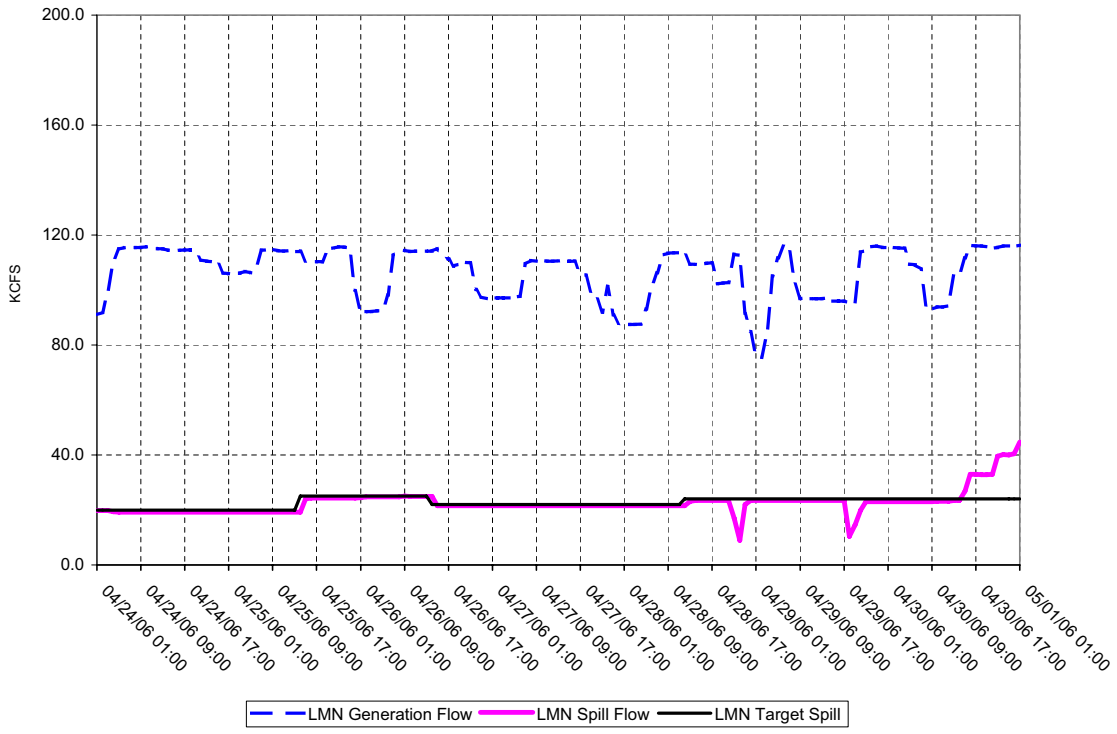
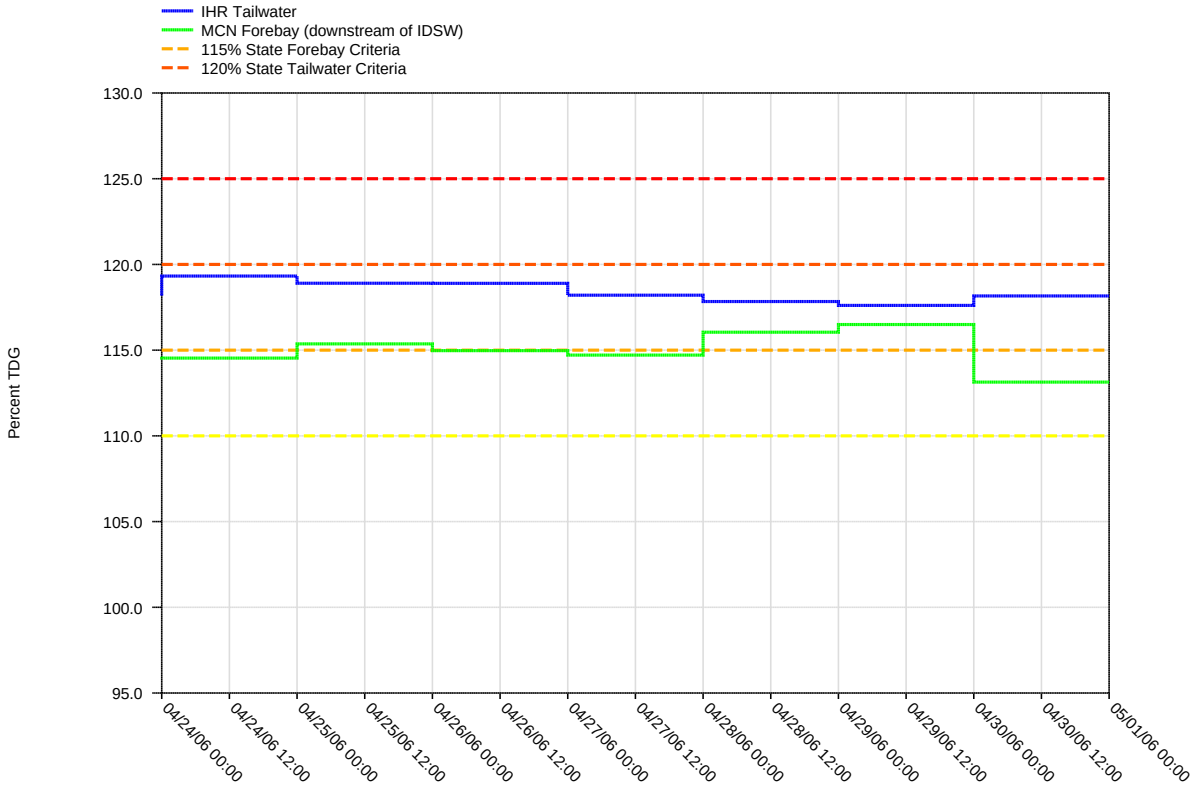


Figure 24.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

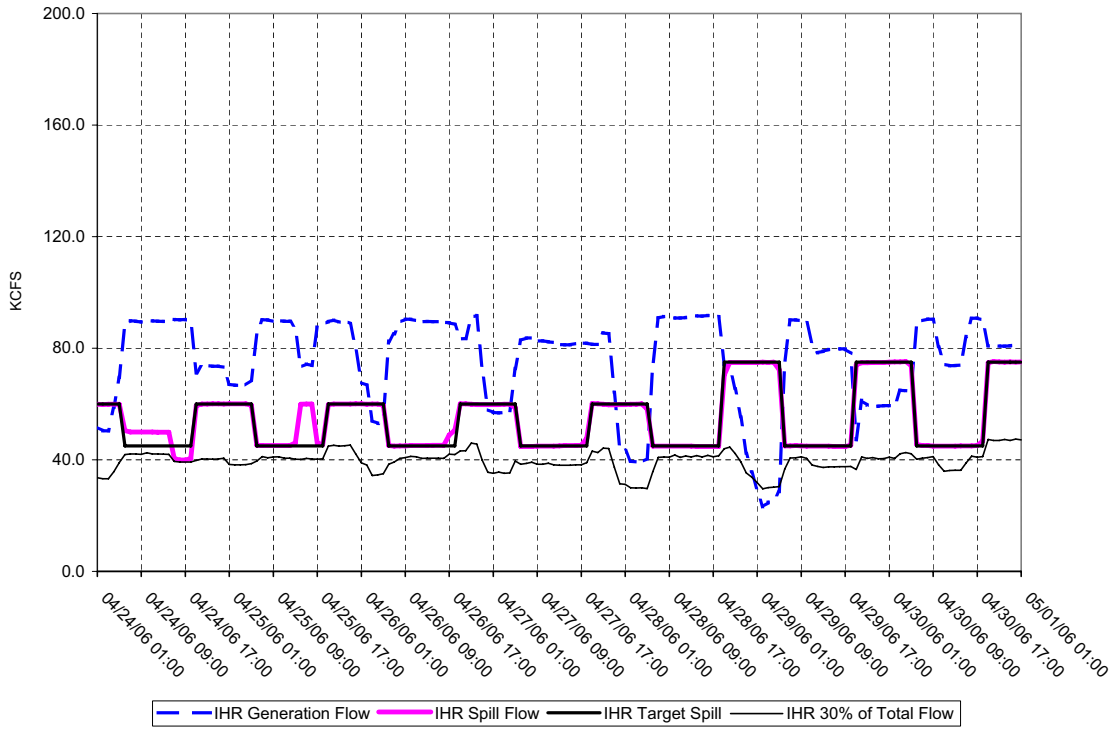
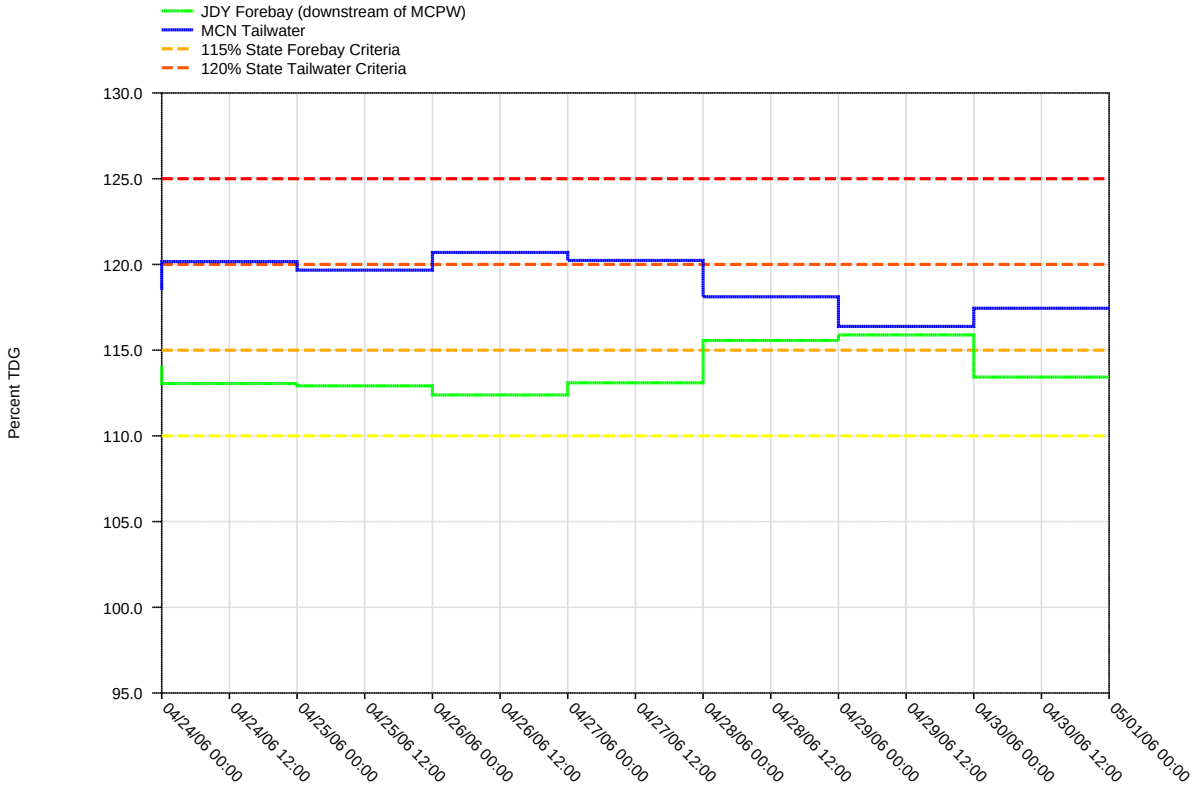


Figure 25.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

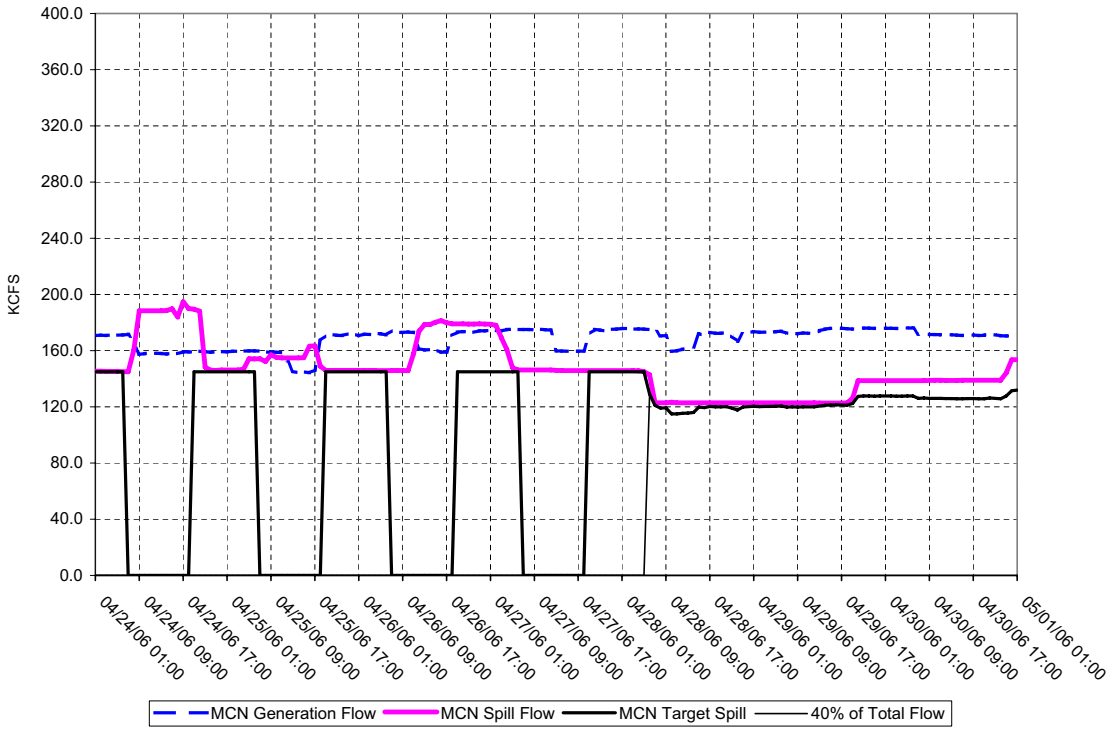
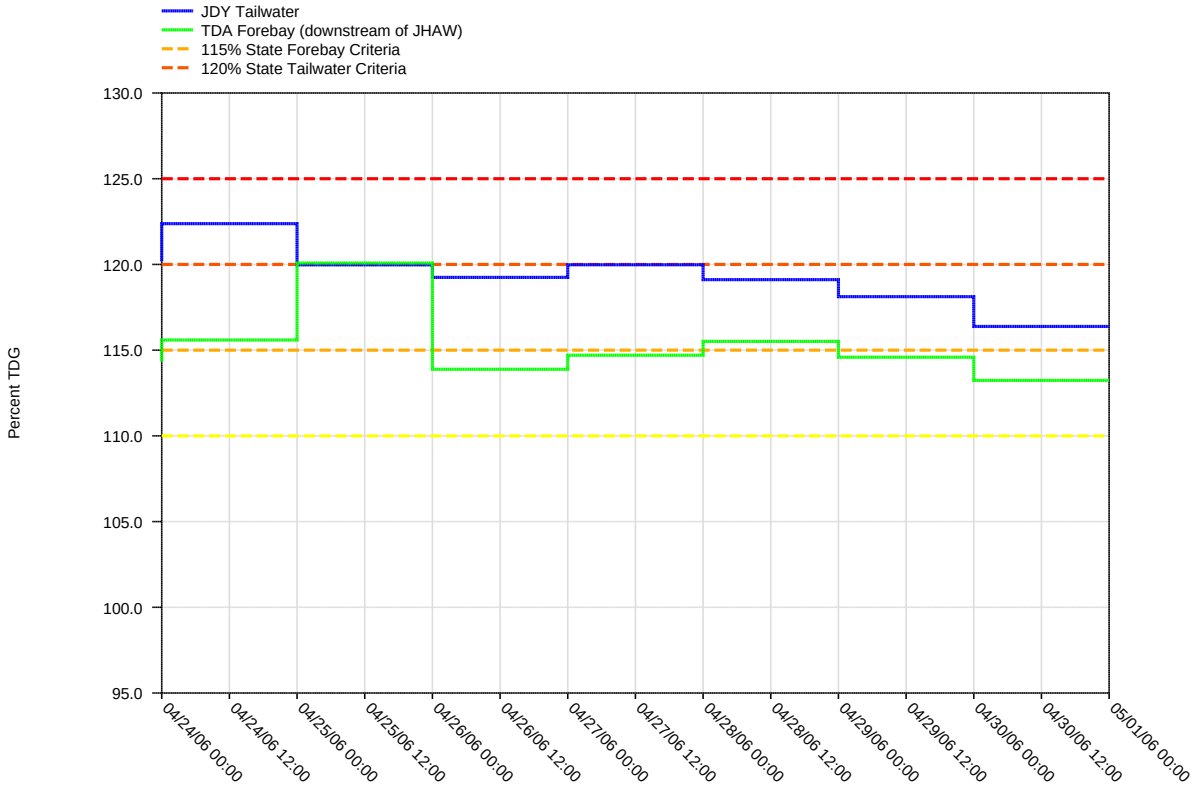


Figure 26.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

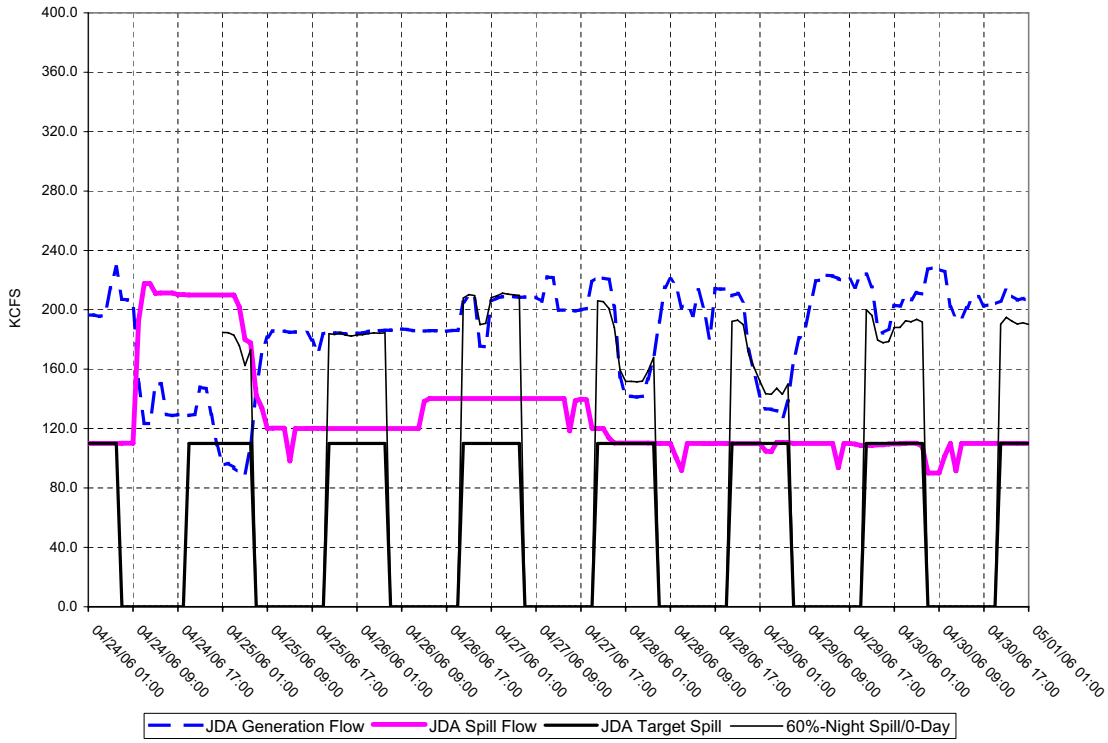
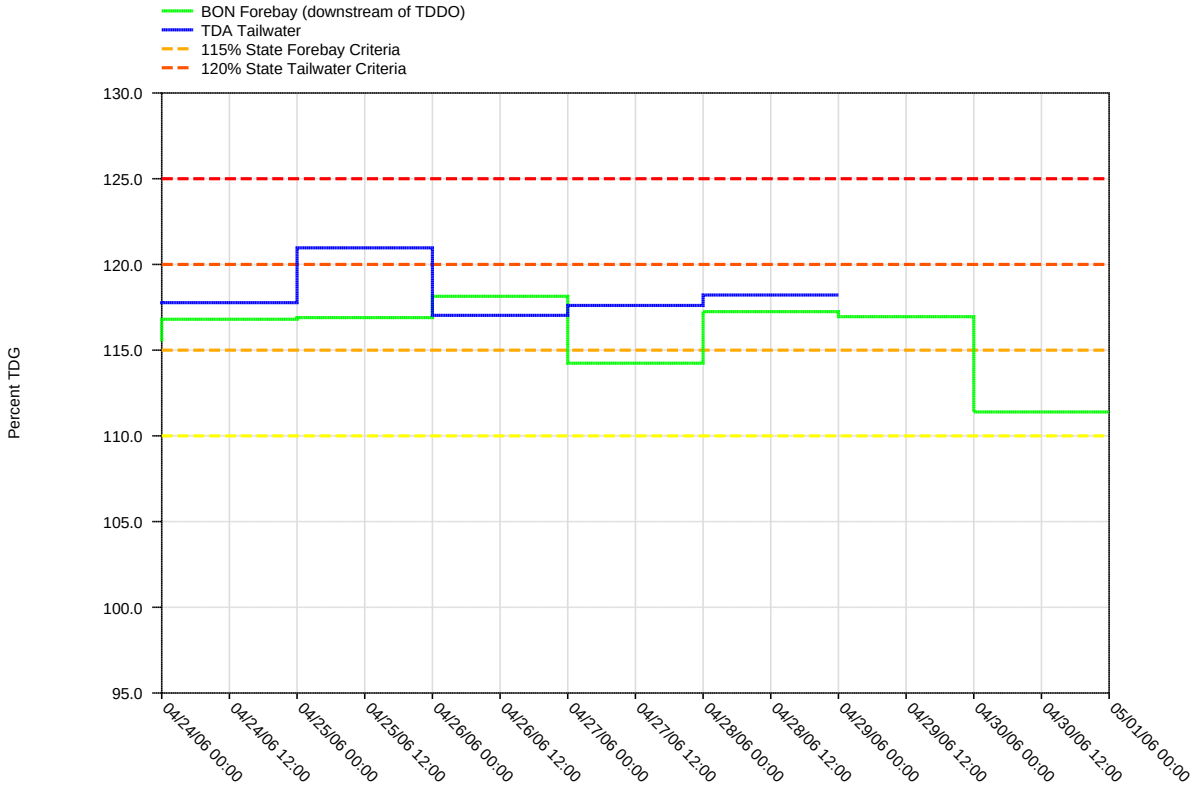
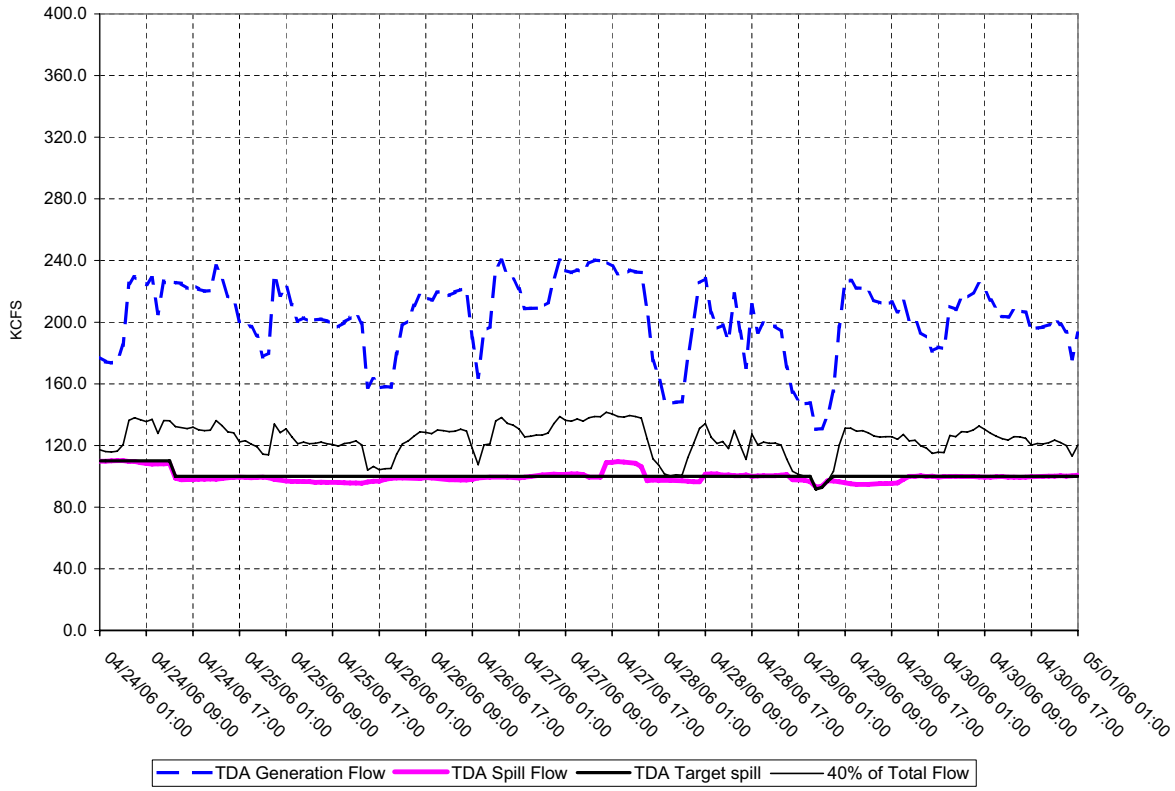


Figure 27.

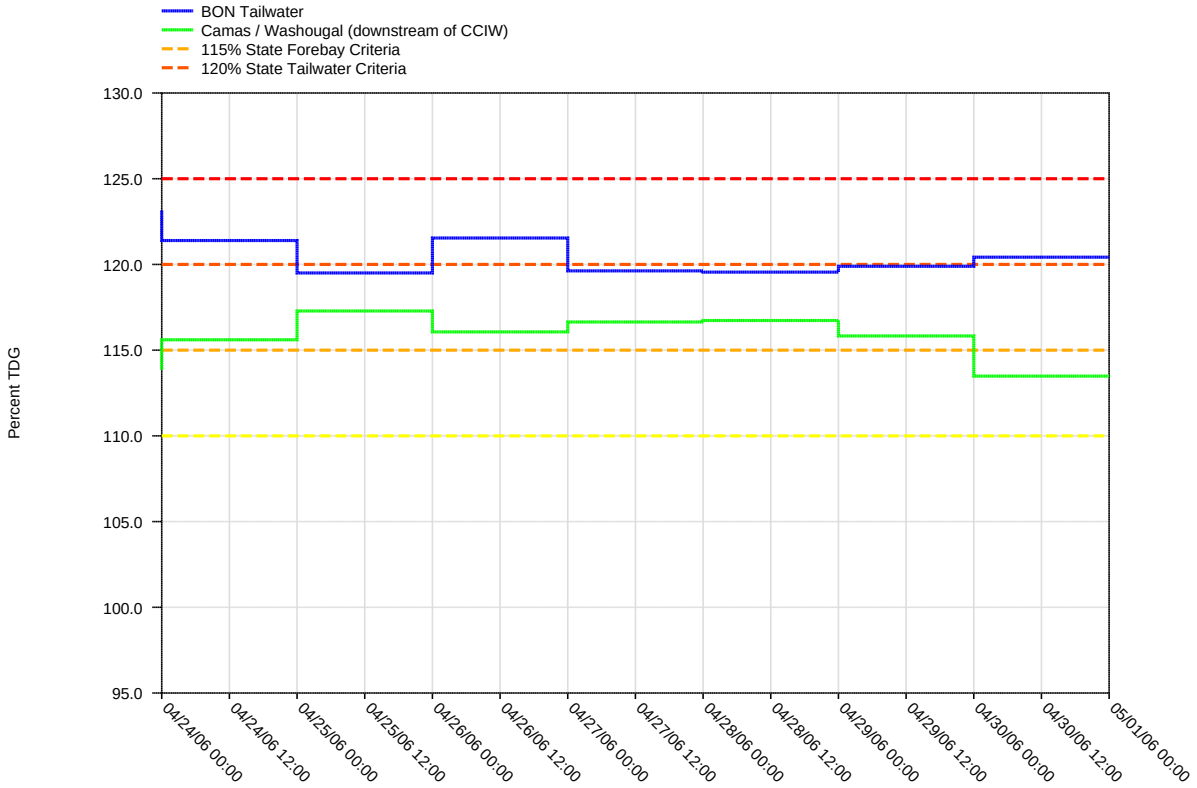
Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow



Daily Average of High 12 Hourly % TDG Values for Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

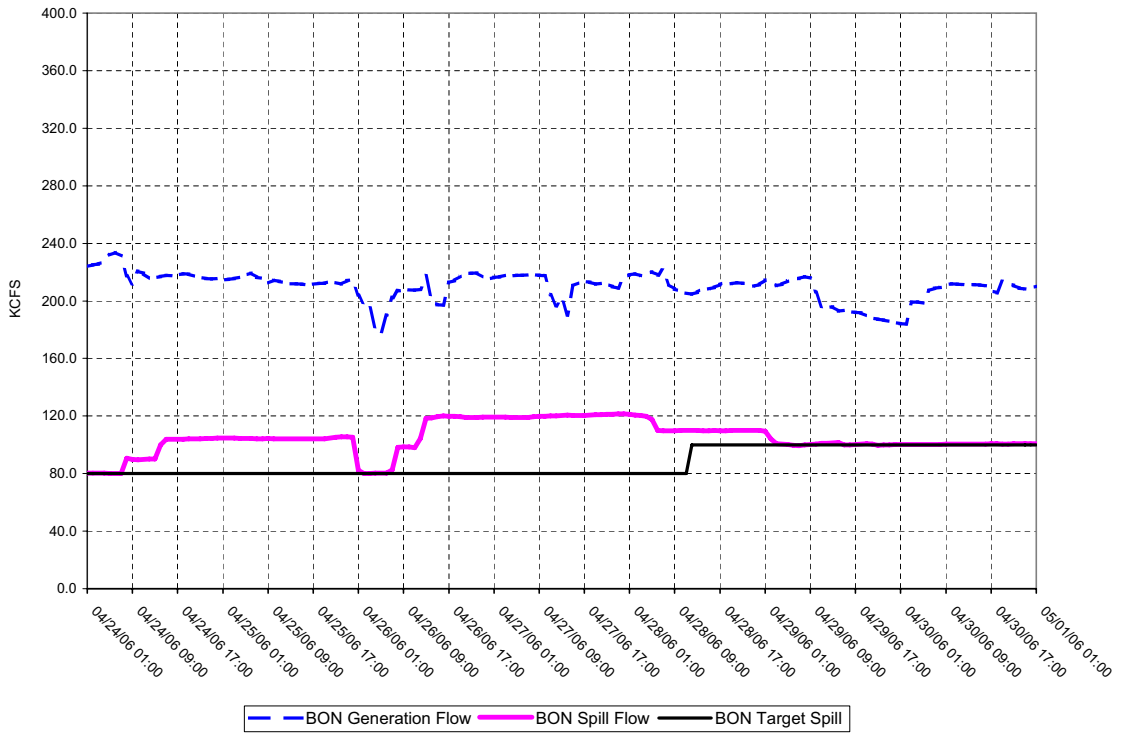


Table 1.
Average percent TDG for 12 highest hours - April 2006

Date	Monitoring Stations (full list)																	
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	WRNO	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	120	115
04/01/2006	102.1	101.9	103.1	102.8	103.4	103.6	103.9	103.7	105.3	105.2	105.7	105.3	105.7	105.7	104.7	120.6	105.3	105.8
04/02/2006	101.9	101.7	101.8	101.9	102.3	102.3	102.5	102.6	104.7	104.5	105.0	105.1	104.9	105.1	104.6	121.9	104.8	105.1
04/03/2006	102.5	112.5	103.0	112.4	102.7	116.2	103.0	116.1	104.4	114.9	105.7	105.5	105.5	105.8	105.4	122.5	105.5	105.2
04/04/2006	102.6	113.9	102.4	112.1	104.4	115.9	106.3	116.4	104.5	112.3	105.7	105.7	105.5	105.6	106.2	120.6	106.9	108.0
04/05/2006	104.4	118.4	104.0	112.6	110.4	116.6	112.8	119.3	106.5	119.5	106.5	113.4	106.0	108.1	106.0	115.6	106.5	107.4
04/06/2006	102.2	115.7	107.7	114.6	109.3	116.7	112.6	122.0	104.2	119.1	104.1	115.5	105.0	110.0	104.5	118.7	108.0	106.1
04/07/2006	104.0	121.7	109.3	117.2	113.0	118.2	113.0	120.9	105.7	119.0	105.1	119.6	106.8	112.2	109.1	121.7	113.6	110.3
04/08/2006	105.6	118.0	111.3	117.1	115.5	118.0	113.4	119.0	107.2	118.9	105.6	111.8	107.7	112.3	110.6	120.4	113.0	111.9
04/09/2006	106.2	117.9	113.9	118.0	114.9	118.1	114.3	119.5	108.6	119.1	107.5	119.4	106.2	109.6	110.9	119.4	112.7	112.4
04/10/2006	106.9	118.9	113.9	118.0	117.5	118.5	115.2	119.4	108.6	119.5	109.9	120.5	111.1	116.6	108.6	121.4	112.5	111.9
04/11/2006	106.7	117.4	114.1	119.1	116.8	118.1	115.5	118.9	109.7	121.7	111.9	120.3	113.3	117.0	114.6	124.1	117.4	115.3
04/12/2006	105.9	118.0	112.5	118.3	117.8	116.7	115.8	119.1	110.6	118.7	112.5	120.0	114.0	117.7	115.7	123.4	117.4	117.9
04/13/2006	106.8	117.7	112.3	119.0	117.1	117.1	115.7	119.8	110.3	118.6	112.7	120.3	113.8	117.6	115.5	119.4	116.2	115.7
04/14/2006	108.5	118.9	114.0	115.7	118.9	116.9	116.5	120.0	111.0	119.5	114.8	120.9	114.8	118.2	116.5	120.1	116.7	115.9
04/15/2006	107.5	121.4	112.2	116.2	115.7	116.8	115.3	120.5	109.6	119.8	114.8	121.8	115.4	118.3	115.0	123.2	116.5	114.8
04/16/2006	105.4	123.0	111.1	117.7	0.0	118.5	112.9	120.8	108.8	119.9	113.0	123.0	118.5	120.0	115.0	124.5	117.8	116.7
04/17/2006	105.0	122.7	112.1	117.1	115.1	117.2	113.1	120.8	109.5	119.6	111.1	121.2	116.4	118.2	115.8	124.5	118.3	116.0
04/18/2006	105.6	120.5	112.9	116.7	116.2	117.4	114.2	120.0	110.7	120.1	109.2	120.5	113.7	117.0	116.1	123.9	118.6	118.5
04/19/2006	108.3	120.9	115.1	117.4	117.6	118.3	116.5	119.5	113.4	120.0	112.2	119.8	114.6	117.5	116.8	123.5	117.7	117.9
04/20/2006	109.5	119.8	115.8	117.7	118.6	118.1	117.6	119.9	116.6	120.4	114.6	121.6	115.3	118.2	117.1	123.2	118.2	118.2
04/21/2006	109.2	116.5	114.9	116.0	118.1	120.5	116.6	118.3	116.4	119.6	115.0	119.6	114.8	117.4	114.8	120.3	116.1	115.5
04/22/2006	107.1	114.6	112.0	115.1	115.2	121.9	114.9	118.1	114.2	118.7	114.6	119.2	113.8	117.4	114.3	123.5	115.3	114.4
04/23/2006	105.5	116.5	109.4	115.2	115.0	121.1	115.2	118.2	114.6	118.5	114.1	120.2	114.3	117.9	115.5	123.1	115.3	113.9
04/24/2006	105.8	118.7	107.7	115.1	113.8	118.3	114.1	119.3	114.5	120.2	113.0	122.4	115.6	117.8	116.8	121.4	116.6	115.6
04/25/2006	107.1	119.7	109.5	114.7	113.8	117.7	113.6	118.9	115.4	119.7	112.9	120.0	120.1	121.0	116.9	119.5	117.0	117.3
04/26/2006	107.3	119.6	111.5	115.6	114.0	120.3	113.7	118.9	115.0	120.7	112.4	119.2	113.9	117.0	118.1	121.5	117.9	116.1
04/27/2006	106.8	117.4	111.6	115.1	114.2	117.0	113.1	118.2	114.7	120.2	113.1	120.0	114.7	117.6	114.2	119.6	116.0	116.6
04/28/2006	107.2	117.4	114.6	115.8	115.8	117.6	114.4	117.8	116.0	118.1	115.6	119.1	115.5	118.2	117.2	119.6	117.1	116.7
04/29/2006	107.9	118.8	115.0	116.2	116.6	117.9	115.8	117.6	116.5	116.4	115.9	118.1	114.6	---	117.0	119.9	116.6	115.8
04/30/2006	106.6	123.0	112.4	116.3	113.9	117.6	113.3	118.2	113.1	117.4	113.4	116.4	113.2	---	111.4	120.4	113.1	113.5

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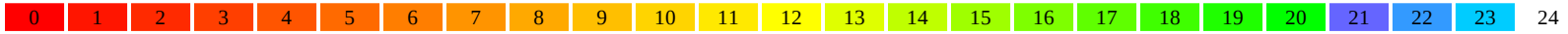
Number of hours of data reported in a given day



Big, bold, red text denotes exceedances.
--- indicates No Data
Dates run from hour 1 to 24 (not 0 to 23).
The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st.
At all other times, the gas cap is 110%.

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
WRNO	Bonneville Tailwater (Warrendale)
CWMW	Camas / Washougal

Effective April, 2006

FISH PASSAGE IMPLEMENTATION PLAN REPORT
May 2006

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

In accordance with the Court's instructions in the December 29, 2005 Opinion and Order, the U.S. Army Corps of Engineers (Corps) is providing the monthly report as described in the Fish Passage Implementation Plan (FPIP) submitted to the Court on April 3, 2006. The Corps' lower Columbia and Snake River project and fish passage operations for the month of May 2006 identified in the Order are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant 12-hour average total dissolved gas (TDG) for the tailwater at each project and for the next project's forebay downstream.

This report also provides information on issues presented and unanticipated or emergency situations that arose during implementation of the spill program for the month of May 2006.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per week in May displaying the progress of the spill program as follows:

(A). Daily Average of the High 12 Hourly % Total Dissolved Gas (TDG) Values - described in the upper graph.
(B). Hourly Spill and Generation Flows – described in the lower graph.

The weekly graphs begin on May 1 and end on May 29 for the following Lower Snake and Lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville Dams.

Each figure represents one week of operation for a project. The graphs start on Monday 0100 hours through Monday 0100 hours for the following dates:

May 1 – May 8	Figures 1 - 8
May 8 – May 15	Figures 9 - 16
May 15 – May 22	Figures 17 - 24
May 22 – May 29	Figures 25 – 32

A. Upper Graph: Shows the resultant daily average percent TDG for the 12 highest hours as the result of spill from the dam. The objective is to operate each project up to the TDG limits without exceeding those limits if possible.

- The blue line on the graph represents the TDG in the tailrace of the dam. 120% TDG is the upper operating limit.
- The green line represents the TDG in the forebay of the next dam downstream. 115% is the upper operating limit.

B. Lower Graph: Represents the flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The heavy red line represents the hourly flow through the spillway in kcfs.
- The thin black line represents the percent spill of total flow; refer to the FPIP for applicable projects and dates.
- Each graph includes a heavy black line that represents the target spill. This is the hourly spill level as defined in the 2006 FPIP. This maximum spill level is subject to the following conditions:
    - Spill percentage or discharge specified in the FPIP;
    - Spill caps as set daily for TDG management;
    - Test spill levels for fish passage research; and,
    - Minimum generation for power system needs.

  The hourly target spill may vary as a function of quantity of river flow and generating units available at a project.

II. A monthly table (Table 1) is included at the end of the report that shows the overall daily results of the average percent TDG for the 12 highest hours for all projects. The numbers in red show exceedances of the TDG gas cap - 115% (forebay) or 120% (tailwater) for each project.

Operations:

For the month of May, at Lower Granite Dam the hourly target spill was a fixed quantity of 20 kcfs through each day. At Little Goose Dam the target spill was 30% of the total flow, except when spill was limited to a lesser quantity to stay within the TDG limits. At Lower Monumental Dam the total spill was limited to quantities less than 40 kcfs, also to remain within TDG limits. At Ice Harbor, McNary, and John Day dams, the spill described in the FPIP varied from daytime to nighttime, and is shown as the heavy black line on the graph. At The Dalles and Bonneville dams, there were periods when spill levels were reduced to stay within TDG limits.

There was high inflow in May across the Columbia Basin. This inflow was the result of warm weather and rapid snowmelt which resulted in high flow in the unregulated (natural) tributaries. Involuntary spill occurred frequently as high flows exceeded powerhouse capacity. As flows remained high through the month, so did involuntary spill levels. As a result there were many hours when the red line/volume of spill was higher than the heavy black/target spill. In many of these instances of involuntary spill, the resultant TDG exceeded the 115%/120% limits. Brief periods when the spill was below the level described in the FPIP can be seen on the graphs where the heavy red line dips below the heavy black line. When the operation varied from the target spill or other anomalies occurred, explanations are included in the table below.

The following describes significant operational adjustments made through the regional forum process:

1. John Day spill operations as a result of units 1 – 4 being out of service were discussed with the TMT and Fish Passage Operations and Maintenance (FPOM). This unit outage was described in the FPIP, with a statement that involuntary spill would occur during the daytime when flows exceeded approximately 246 kcfs. This condition existed during most of May. In response to System Operational Request (SOR) # 2006-3 dated April 4, the Corps agreed to closely monitor fish passage and hydraulic conditions, then if needed, address any observed problems through operational changes to assure efficient passage of migrating fish. The Corps continues to monitor the conditions to ensure that safe and efficient fish passage is maintained.

2. Juvenile fish transportation operations at lower Snake River projects continued through May and on May 30th operations changed from daily to every other day at Lower Granite.

In addition, there were also minor operational adjustments made through the regional forum process:

1. A variance of +/- 1% of percent of total flow for The Dalles was discussed and agreed to at the May 17 Technical Management Team (TMT) meeting. Reservoir Control Center (RCC) issued instructions to The Dalles project to make these adjustments.

2. Final dates for the summer spill test at Lower Granite were coordinated with TMT members on May 31 and June 2. The FPIP specifies dates of approximately June 20 – July 21, with regional coordination to determine final dates. The summer spill test will begin on June 8 and end on July 17. The earlier dates were set to coincide with the juvenile fish migration and improve fish availability. All TMT members present agreed to these changes. The spill discharge level for the two alternating test conditions will be the same as stated in the FPIP.

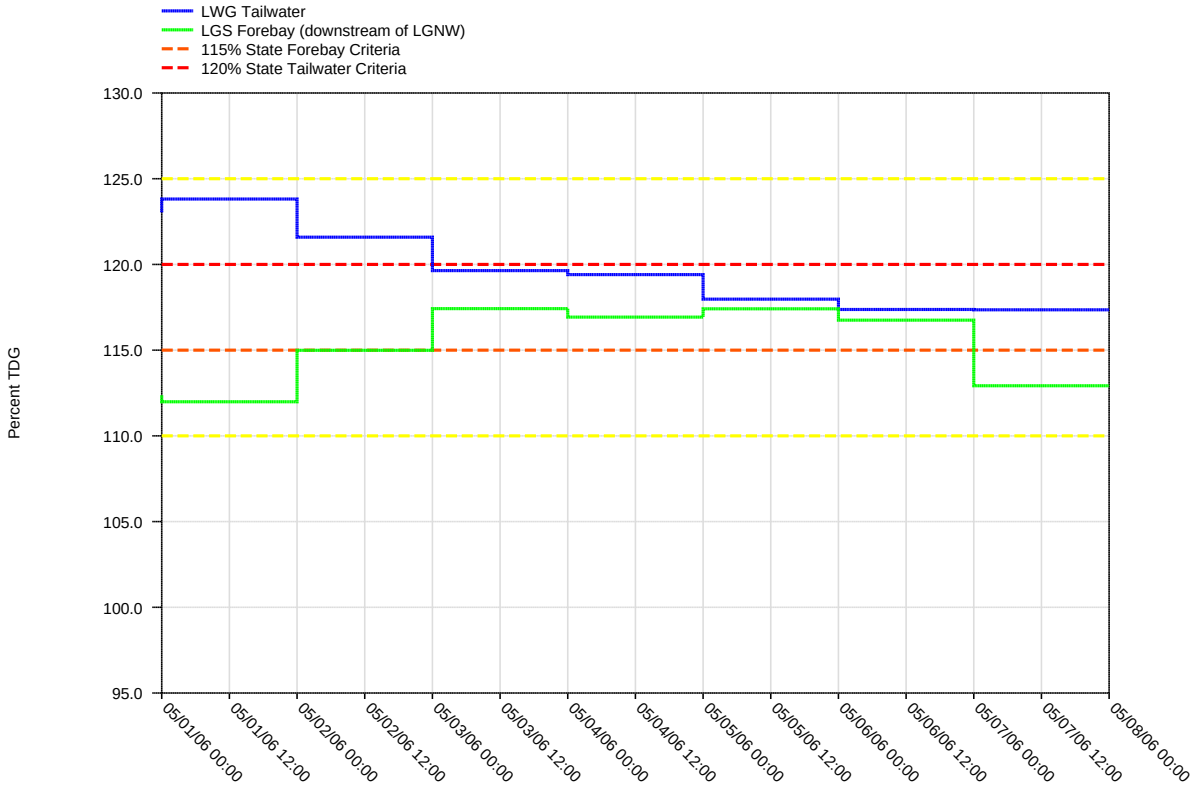
Variances from target spill and other anomalies in the graphs

Project	Parameter	Date	Time	Reason
Lower Monumental	Spill volume	5/1 5/2 5/3 5/4 5/5 5/6 5/7 5/8 5/9 5/10 5/11 5/12 5/13 5/14 5/15	1900 2100-2200 1900-2100 2300-2400 1900-2100 2100-2200 2000-2200 1900-2000 1900-2100 2000-2200 1900-2100 1900-2000 1900 2000-2100 1800-2000	A fish barge was crossing the spillbay and loading fish after going through the locks. The duration of the reduced spill was typically between 15-30 minutes.

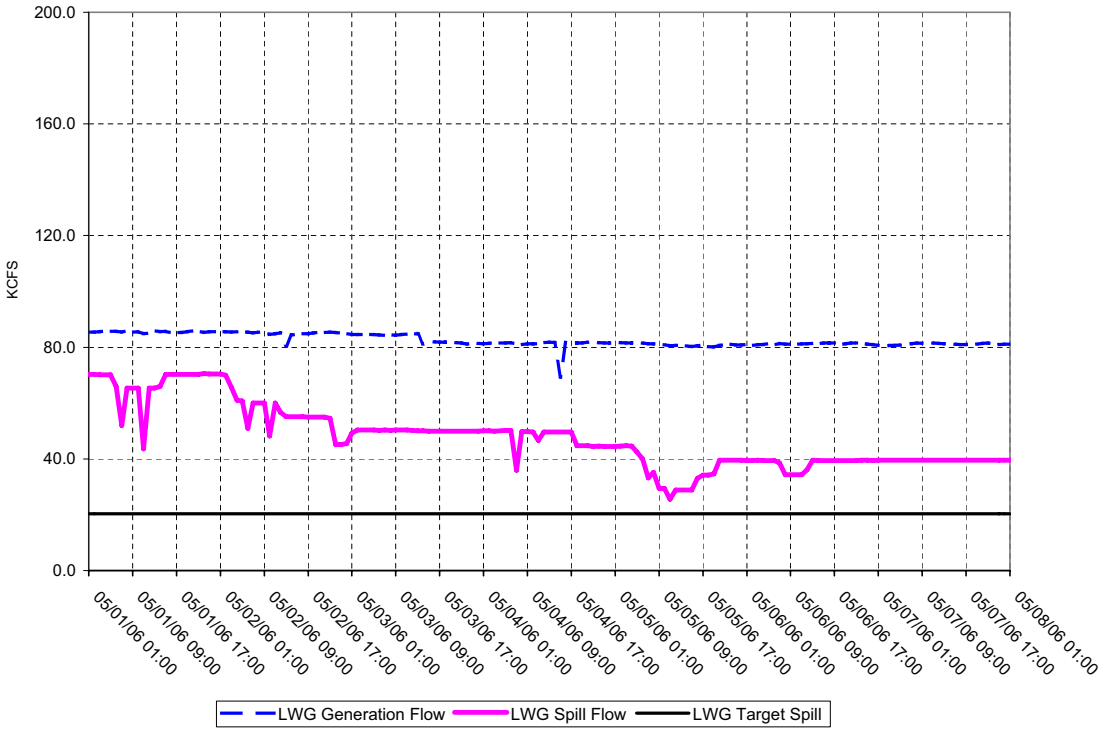
Project	Parameter	Date	Time	Reason
Lower Monumental	Spill volume	5/16 5/17 5/18	1800-2100 1800 1800-1900	Fish barge crossing times, continued from previous page.
The Dalles	Spill volume	5/6	0900-1200	Goal 40%, about 38% reached. BPA was addressing changes in efficiency caused by changes in head; sent wrong spill quantity to project.
John Day	Spill volume	5/7	0500-0600	Two barges were passing the dam and requested reduced spill for 30 minutes for safe passage.
Little Goose	Spill volume	5/8	1400-1500	One hour lag time to increase to Target Spill due to response time required by operator to make adjustment.
The Dalles	Spill volume	5/10	0700-1600	Goal 40%, 37.3-38.5% reached: Project limited spill slightly to get forebay elevation up for safe barge passage.
The Dalles	Spill volume	5/11	0900-1200	Goal 40%, reached 37.2-38.8%: The Dalles was carrying reserves and fluctuated with the hydro-system demand to ensure grid stability.
John Day	Spill volume	5/11	2200	Tidewater barge requested reduced spill to pass the project. Spill dropped 10 kcfs, from 140 (Spill Cap) to 130 kcfs for 30 minute duration.
The Dalles	Spill volume	5/12	1000-1400	Goal 40% or 120 kcfs spill cap, Project Operator Error: A new operator set spill according to the FPP table instead of the GDA readings that are more accurate.
McNary	Spill volume	5/15	1500 - 1700	Spill dropped to 38.6% for two hours. BPA adjusted generation and the forebay dropped slightly resulting in a slight drop of spill
McNary	Spill volume	5/16	1300-2100	Goal 40%, achieved 38.3-38.6%: Due to project maintenance, cleaning the vertical barrier screens, the spill quantity and data readings were impacted.
The Dalles	Spill volume	5/16	1000-1500	Goal 40% or 110 kcfs Spill Cap, reached 37.3-38.5%: The Dalles was carrying reserves and fluctuated with the hydro-system demand to ensure grid stability.
The Dalles	Spill volume	5/16	1000-1500	Goal 40% or 110 kcfs Spill Cap, reached 37.3-38.5%: The Dalles was carrying reserves and fluctuated with the hydro-system demand to ensure grid stability.
John Day	Spill volume	5/20	2400	Goal 150 kcfs, Spill dropped to 95.7kcfs: A Tidewater barge requested reduced spill for 30 minutes for safe passage.
Lower Monumental	Spill volume	5/24	1200-1300	11 tug boats were going through and needed safe passage conditions; spill reduced for 30 minute duration.

Figure 1.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



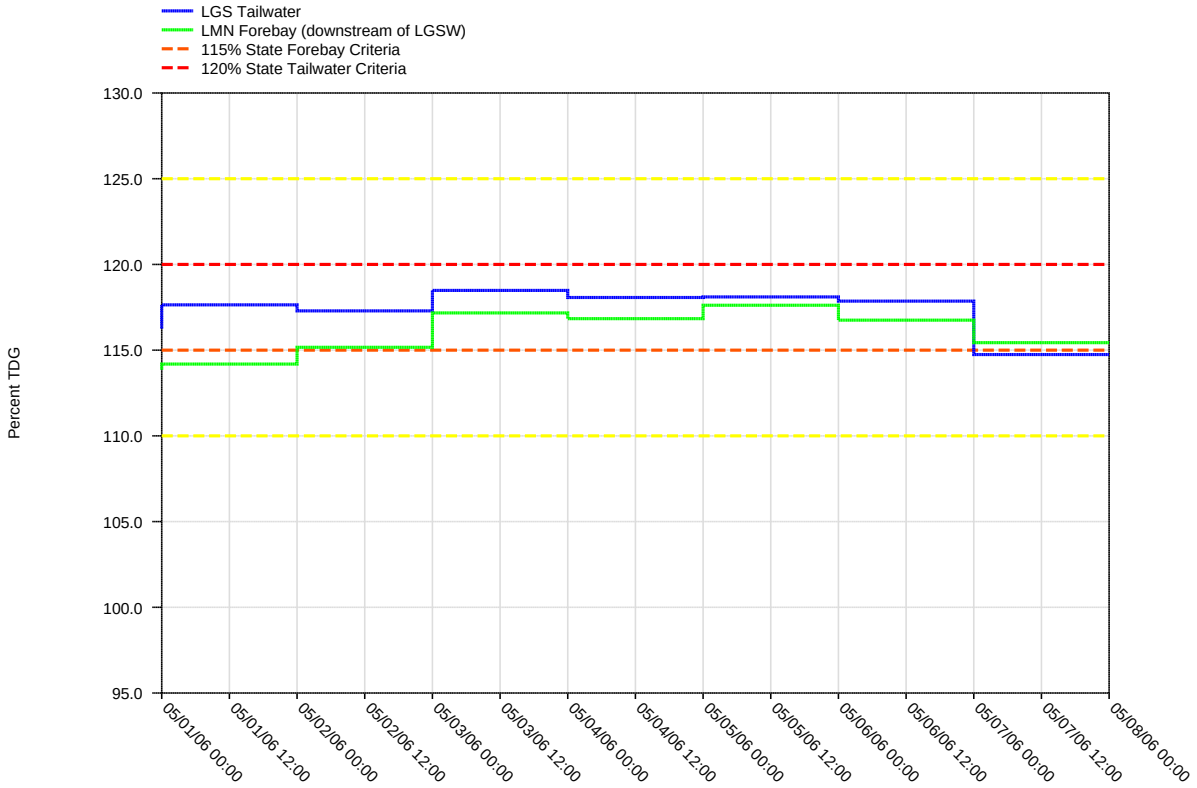
LOWER GRANITE DAM - Hourly Spill and Flow



Planned Spill in FPIP is 20 kcfs

Figure 2.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

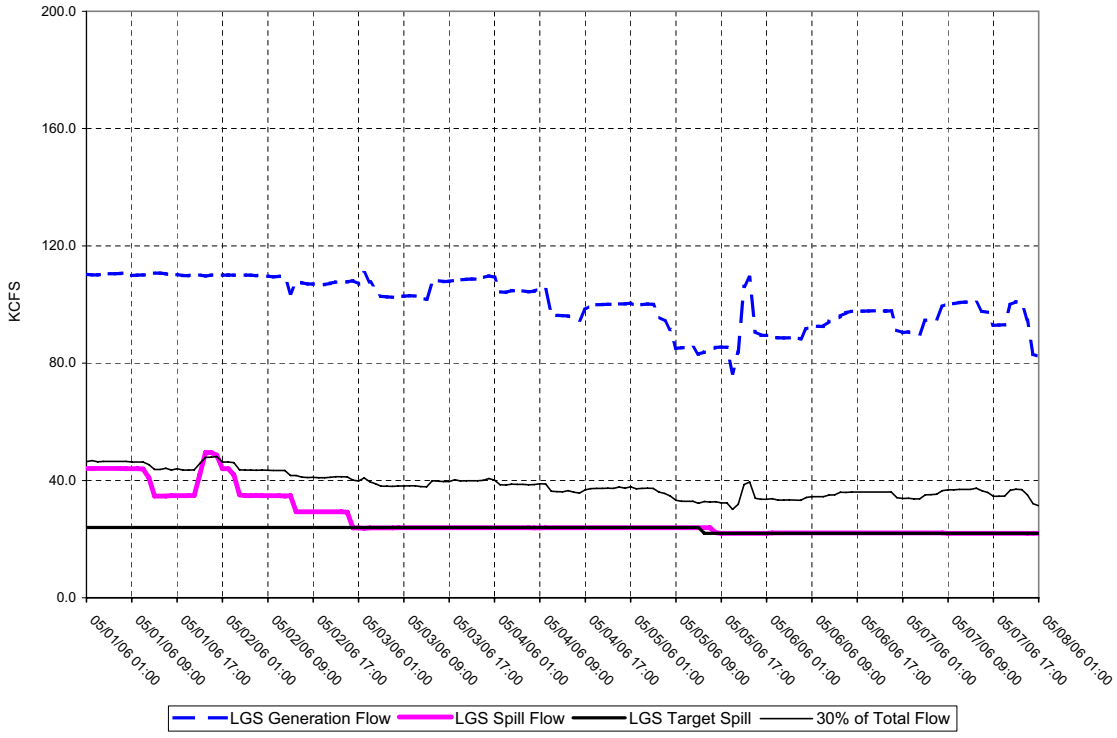
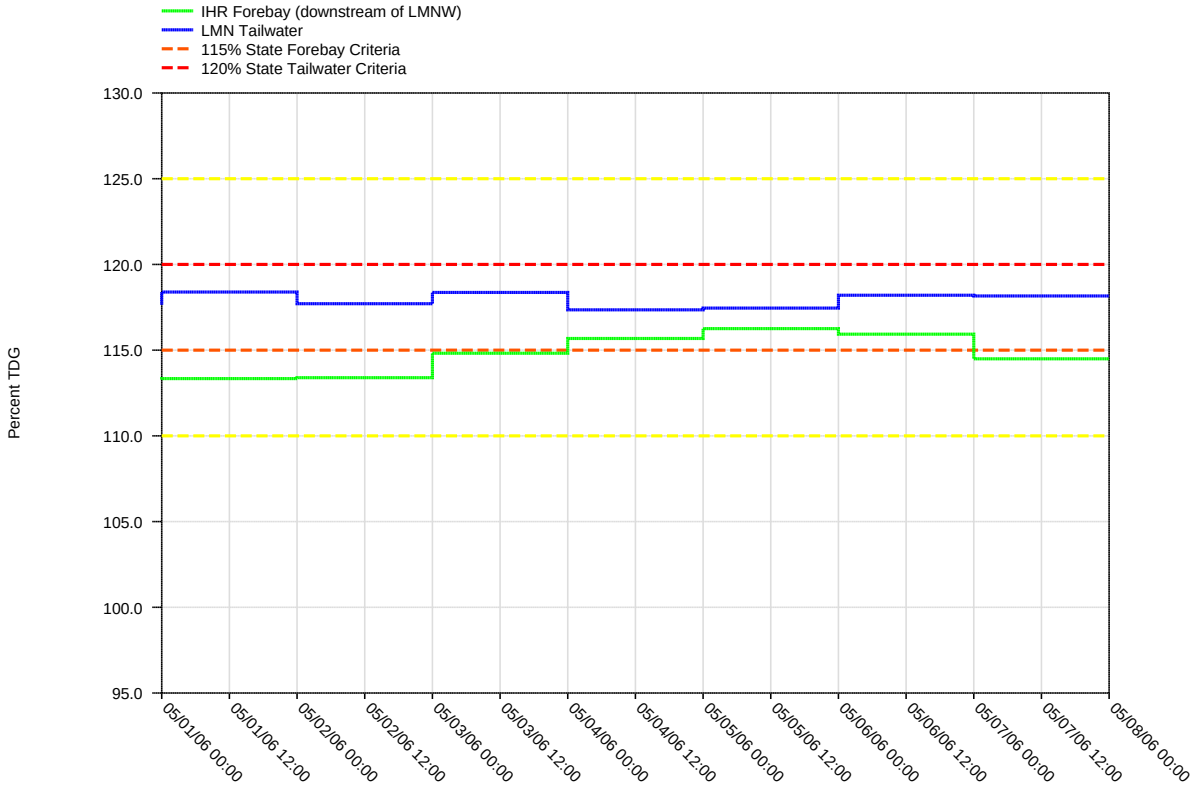
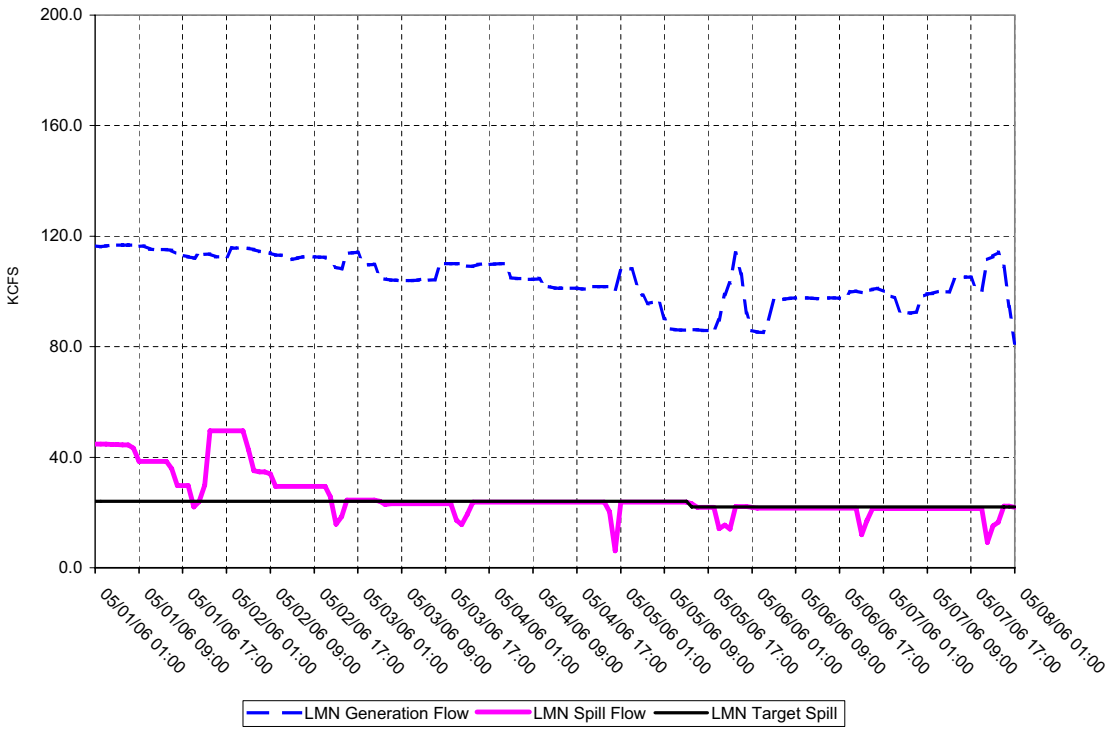


Figure 3.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



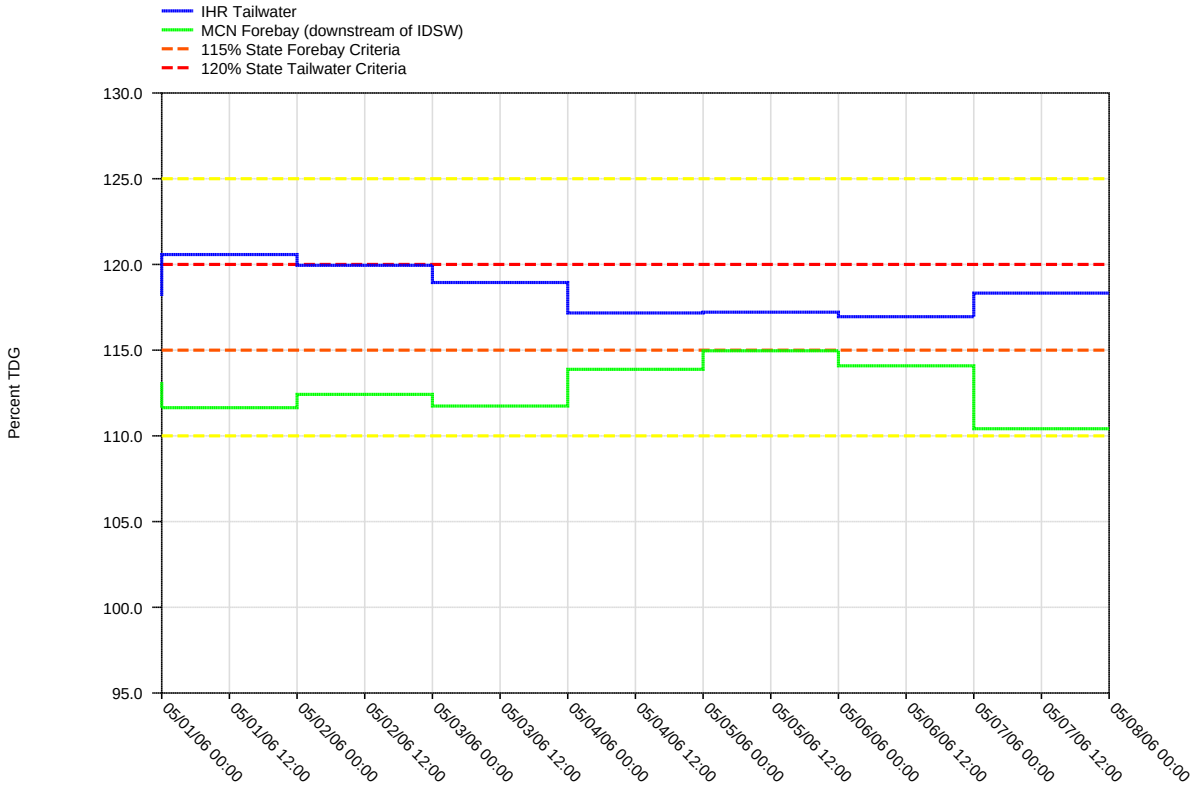
LOWER MONUMENTAL DAM - Hourly Spill and Flow



Planned Spill in FPIP is 40 kcfs

Figure 4.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

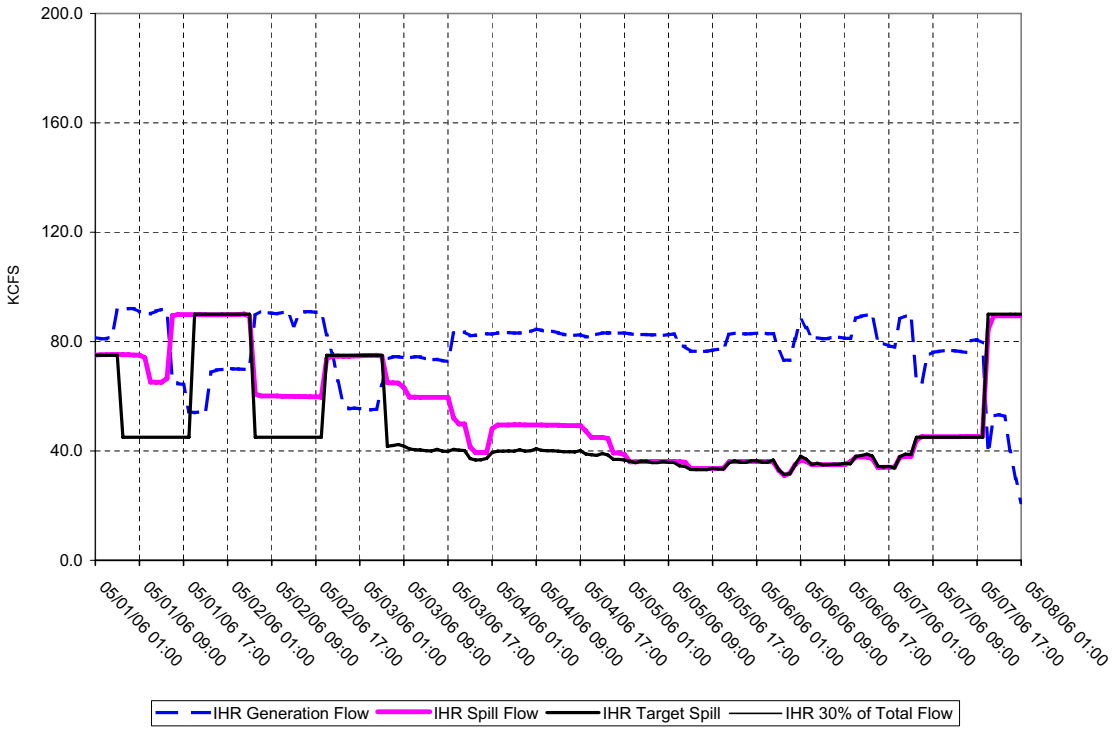
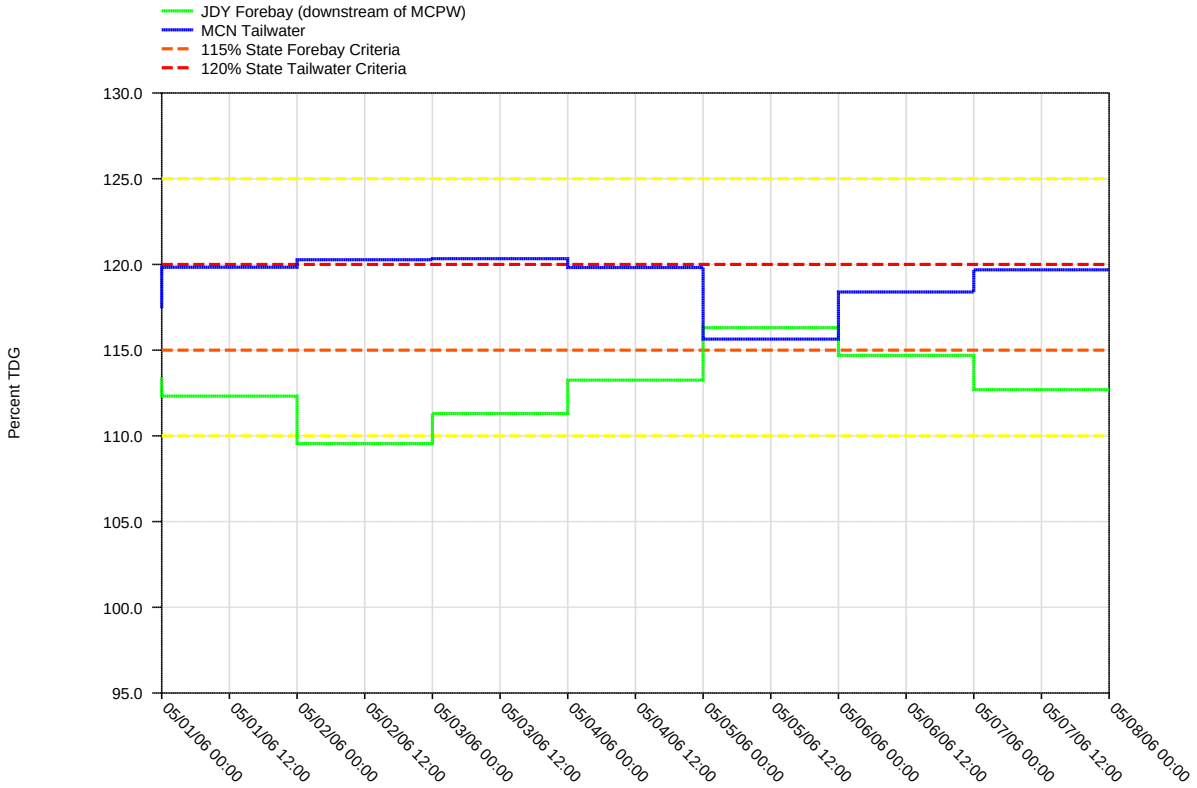


Figure 5.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

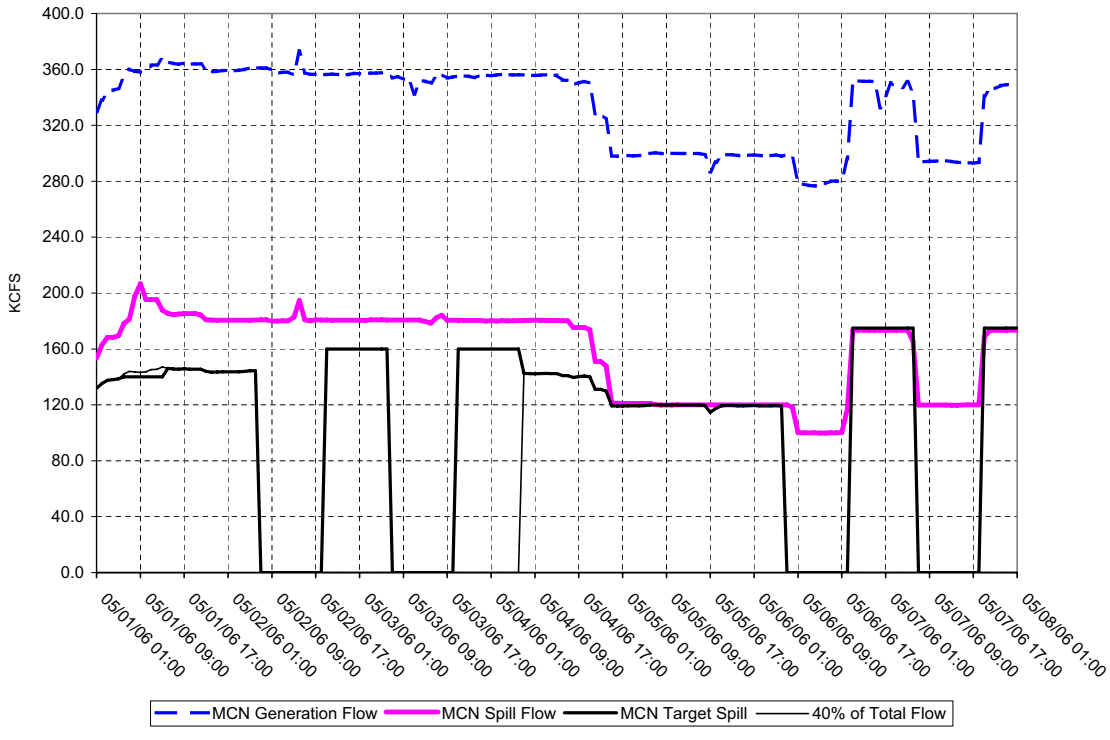
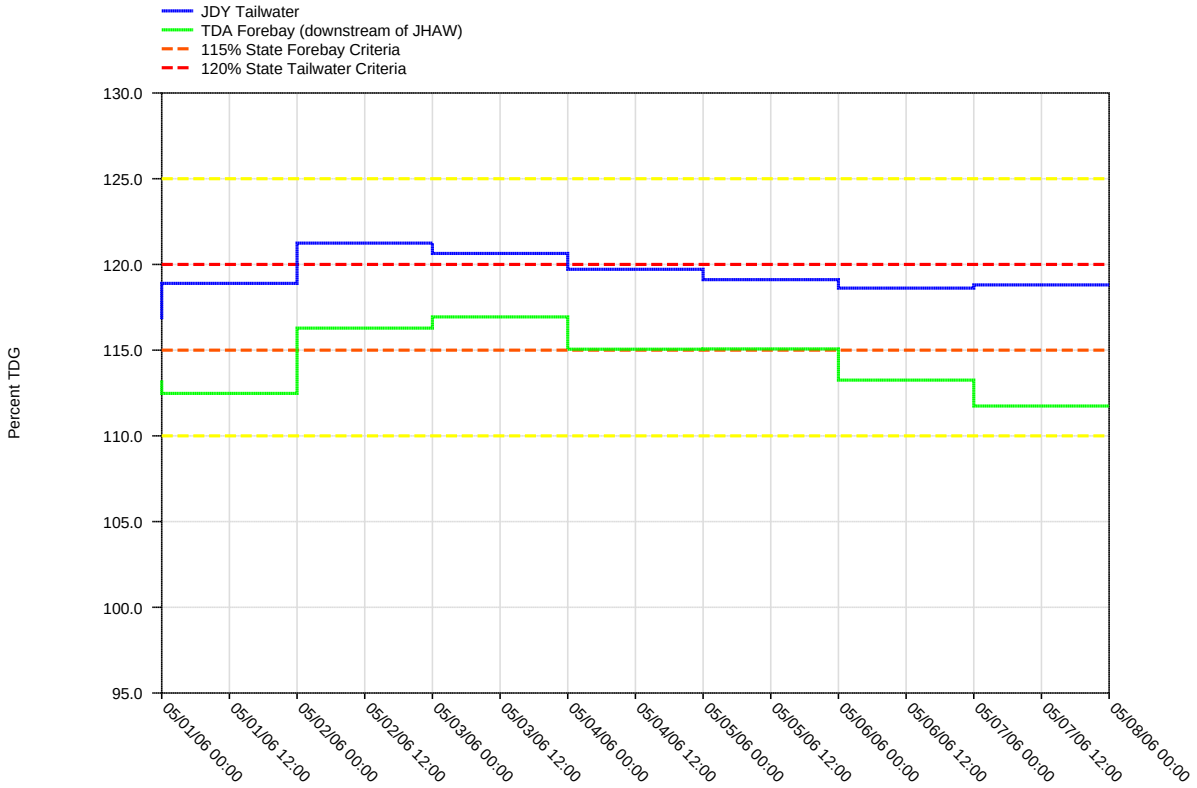


Figure 6.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

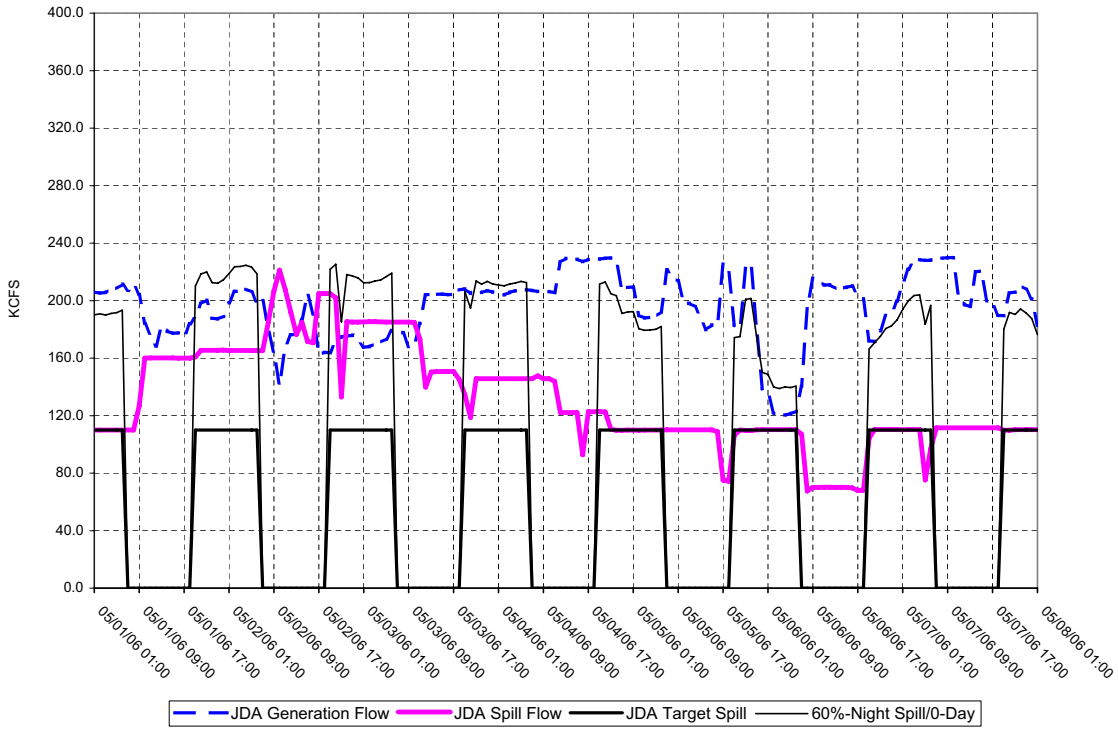
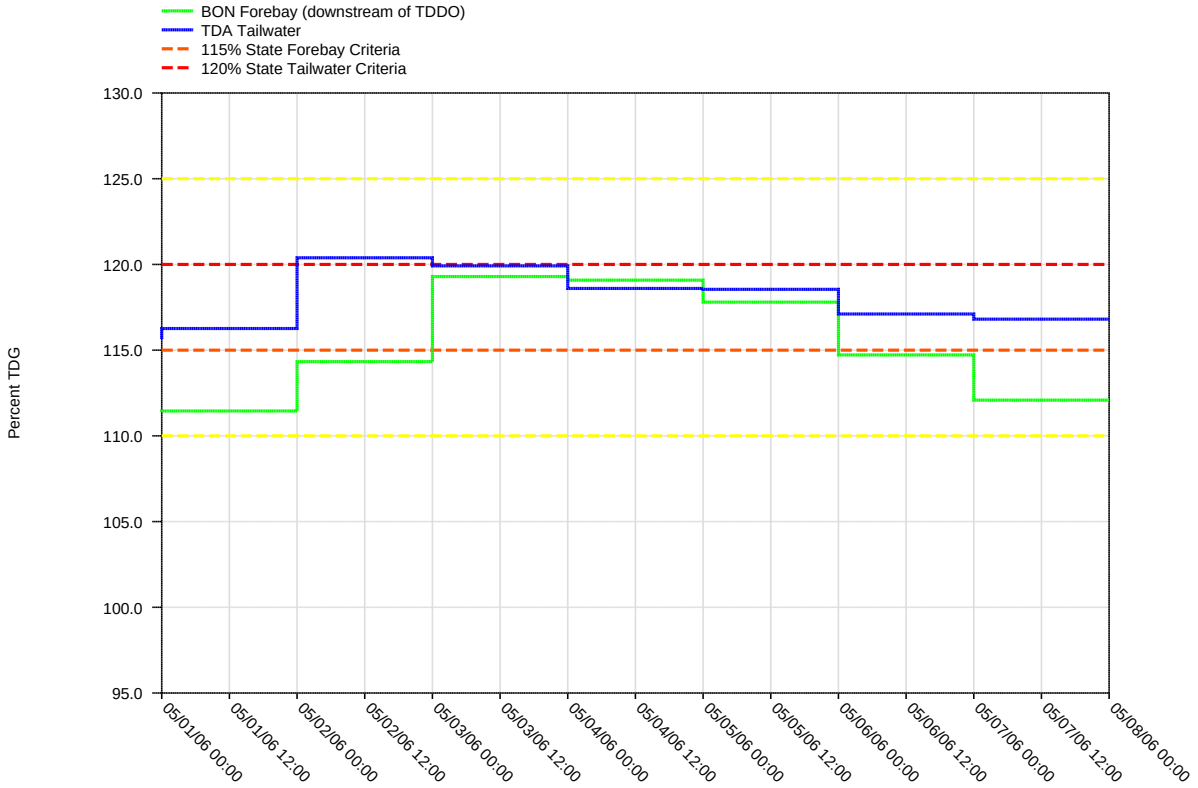


Figure 7.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

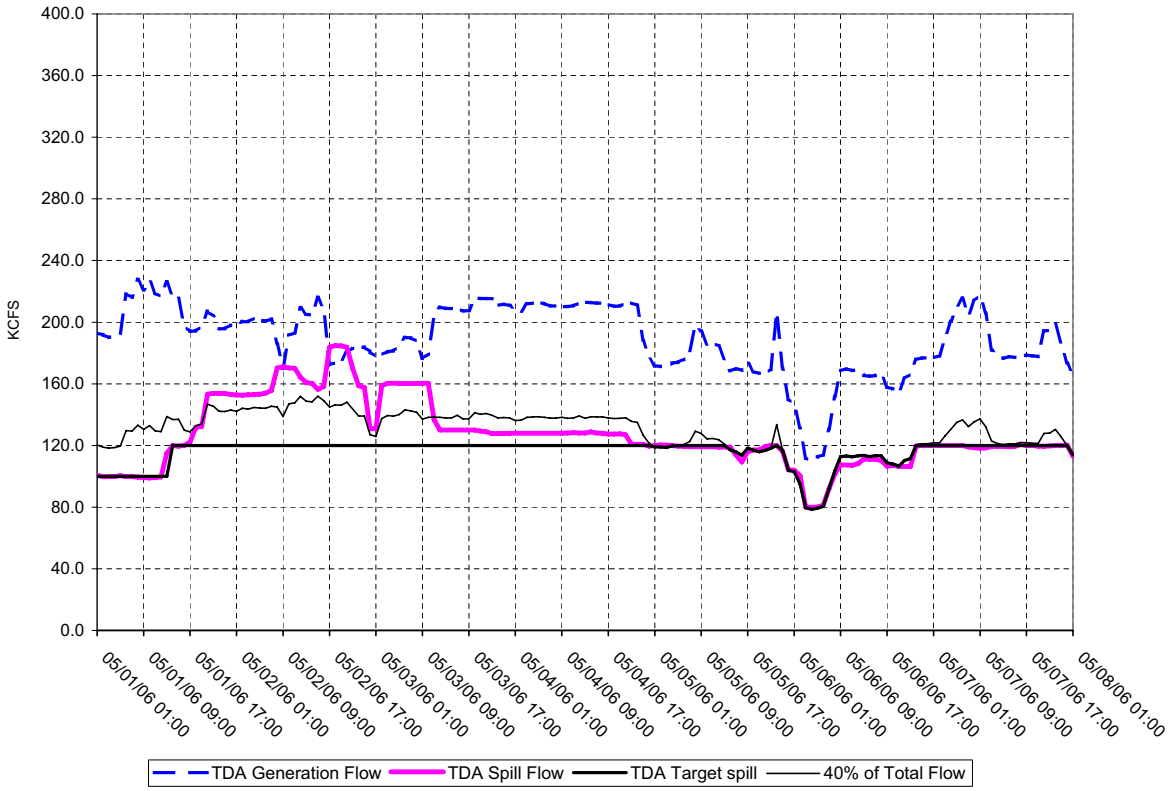
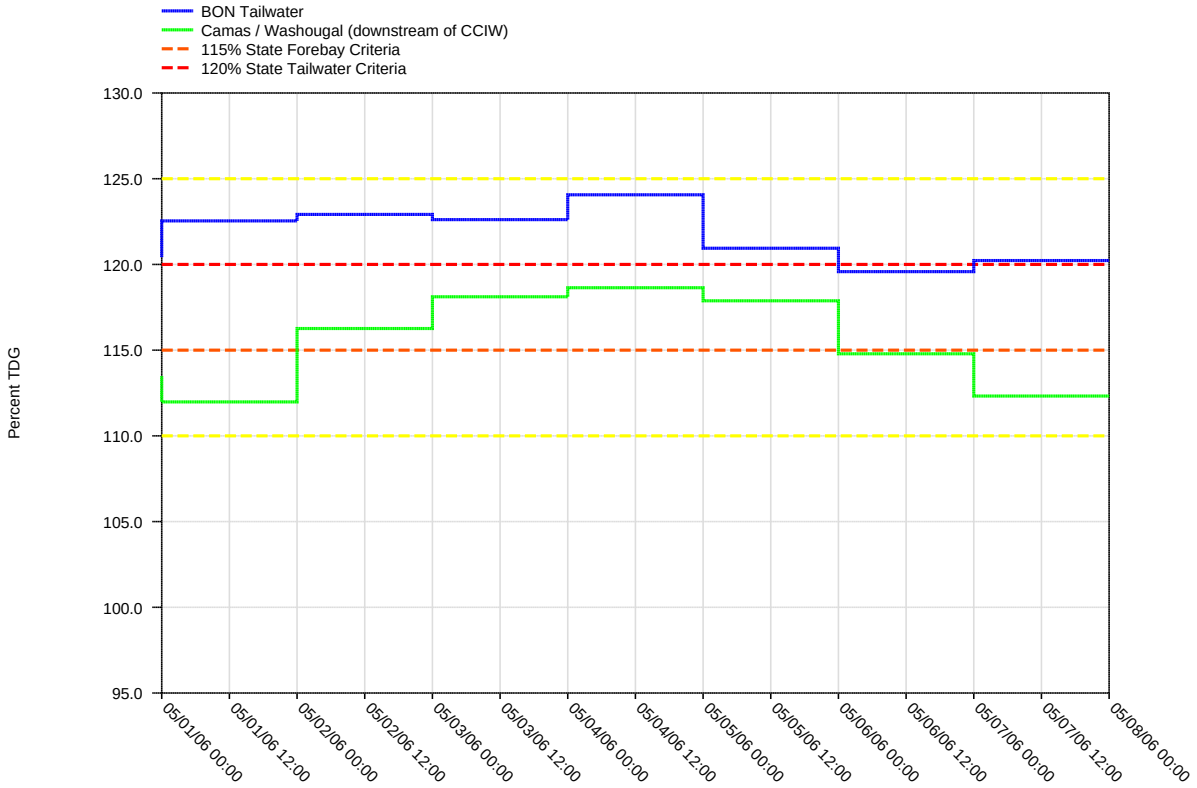
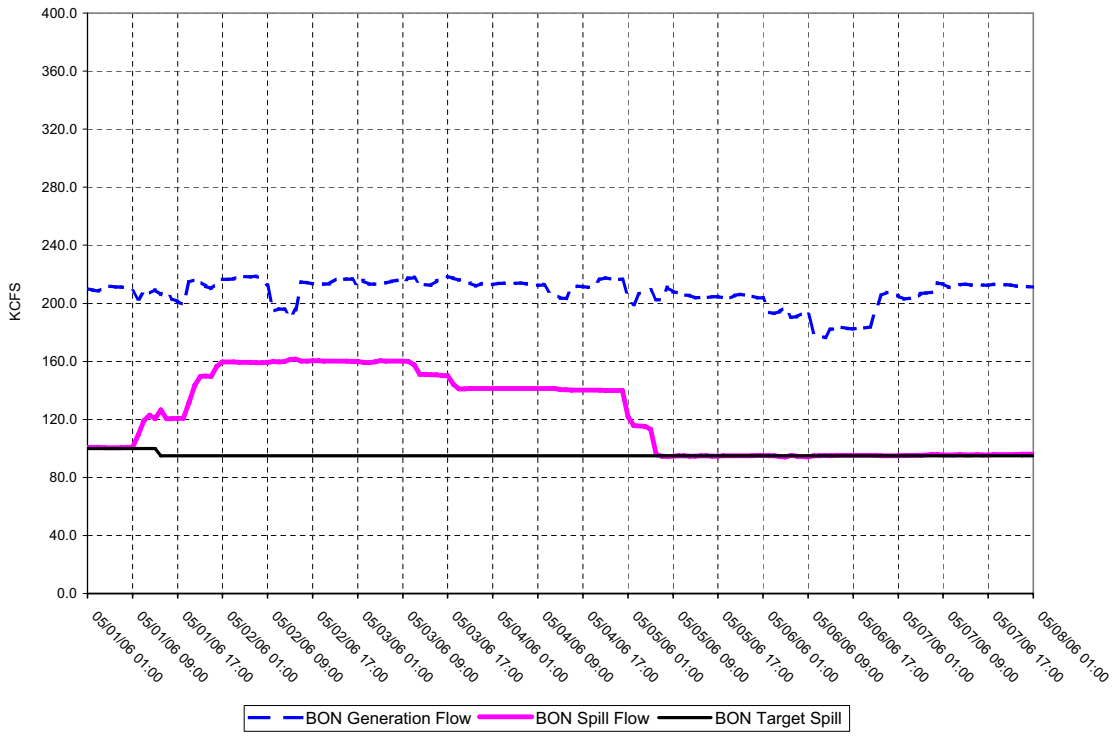


Figure 8.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



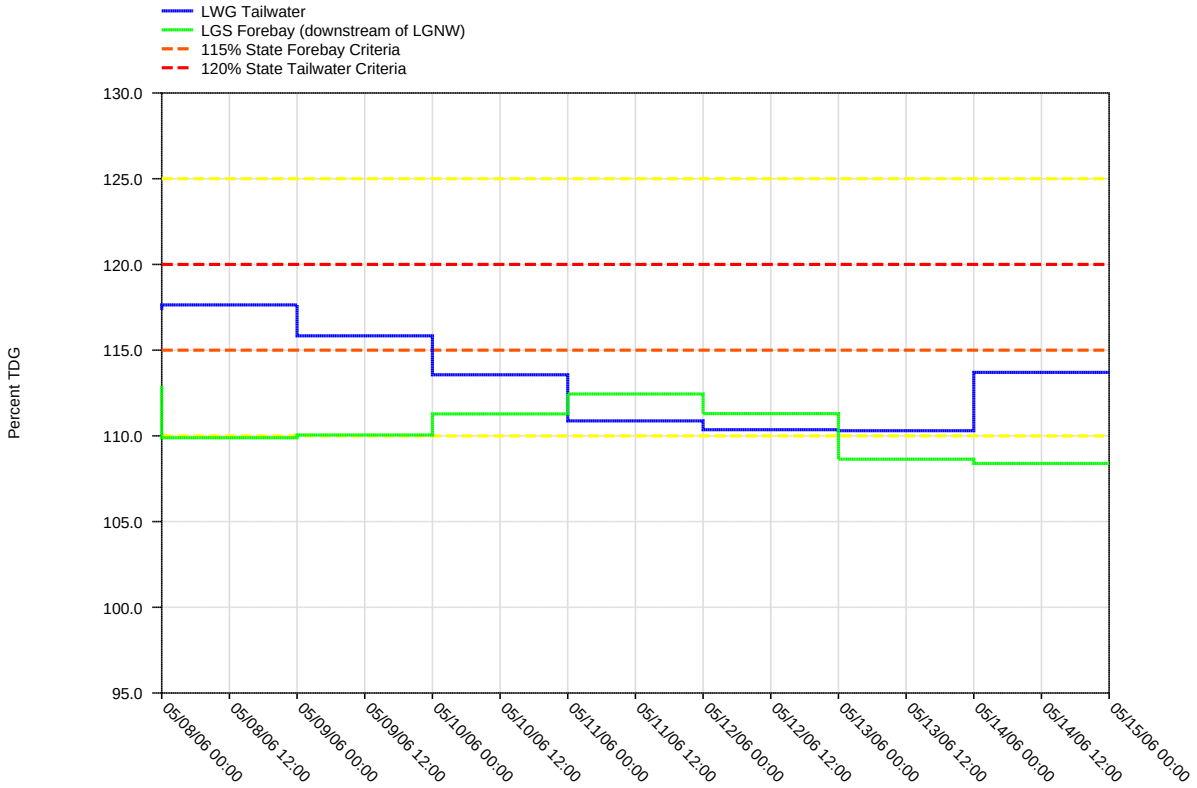
BONNEVILLE DAM - Hourly Spill and Flow



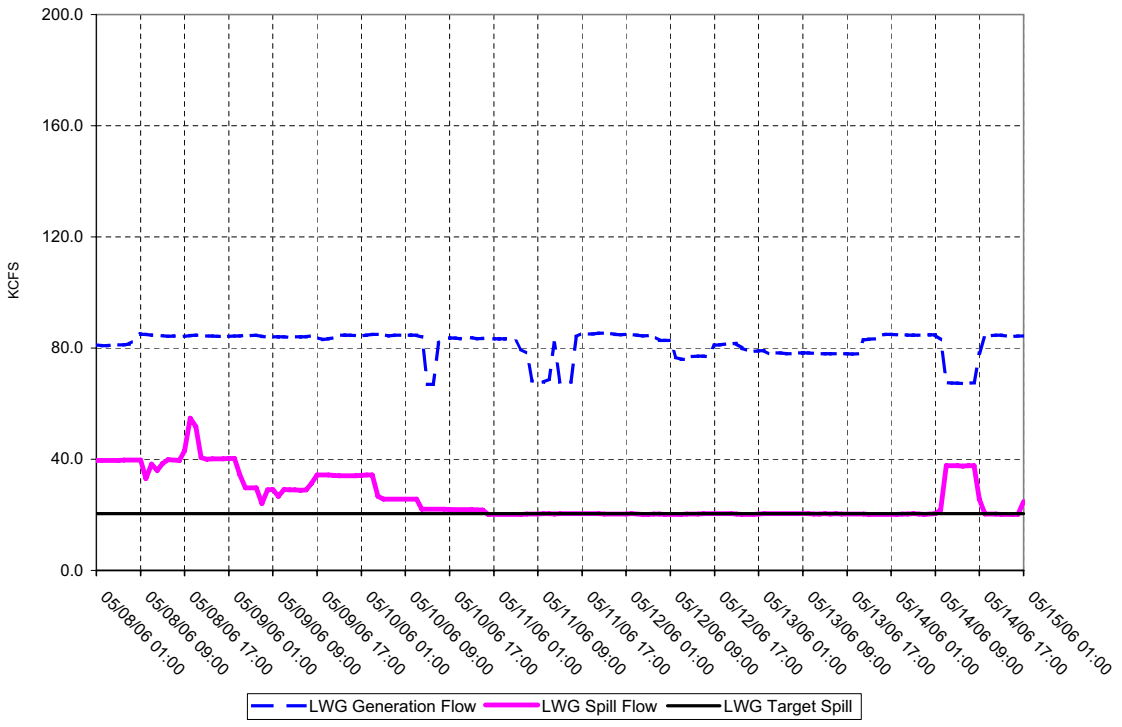
Planned Spill in FPIP is 100 kcfs

Figure 9.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



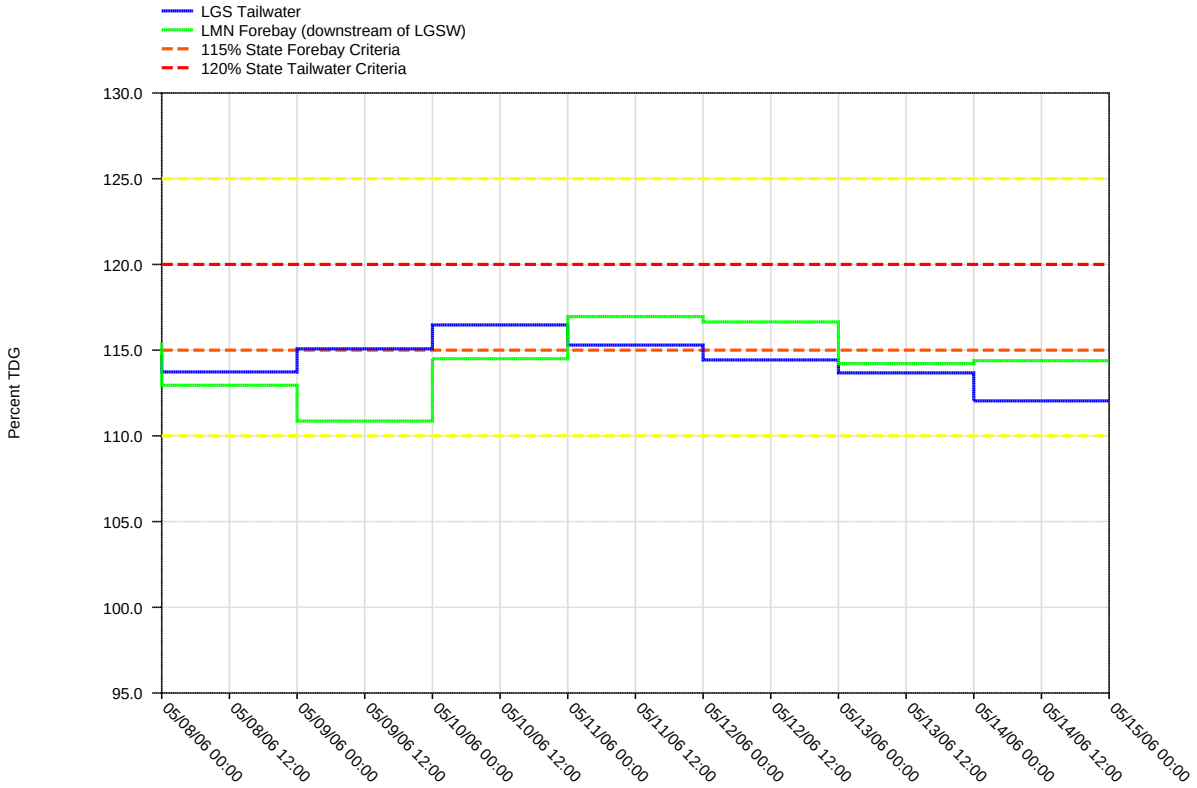
LOWER GRANITE DAM - Hourly Spill and Flow



Planned Spill in FPIP is 20 kcfs

Figure 10.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

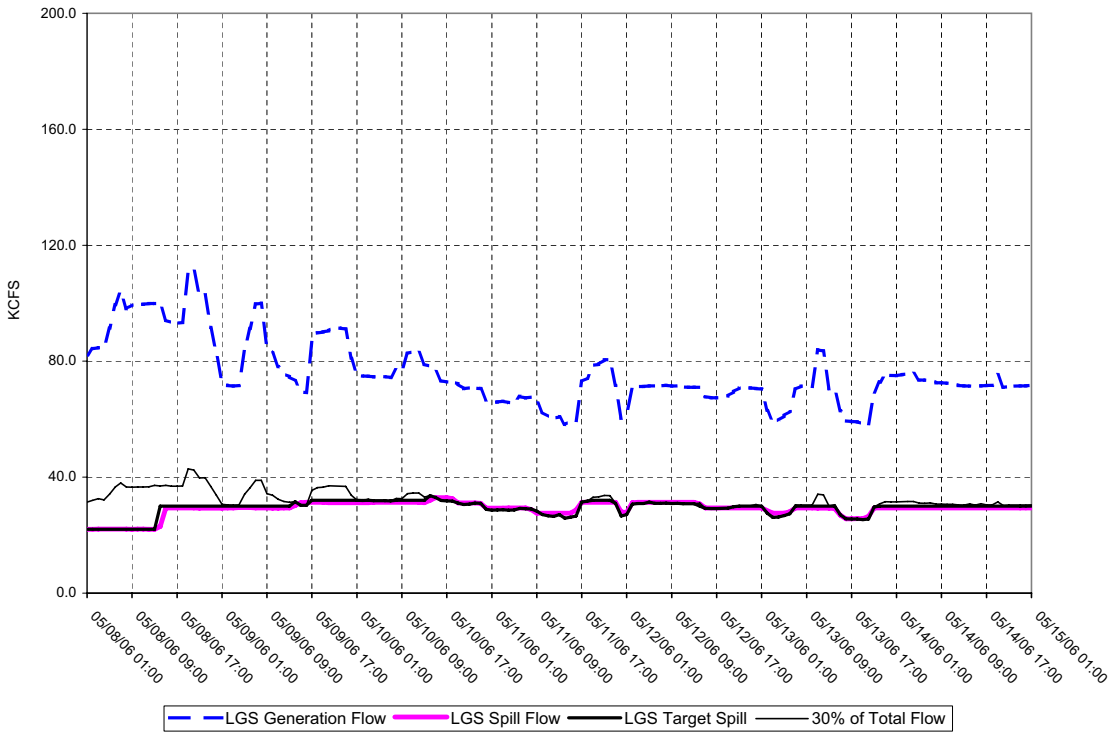
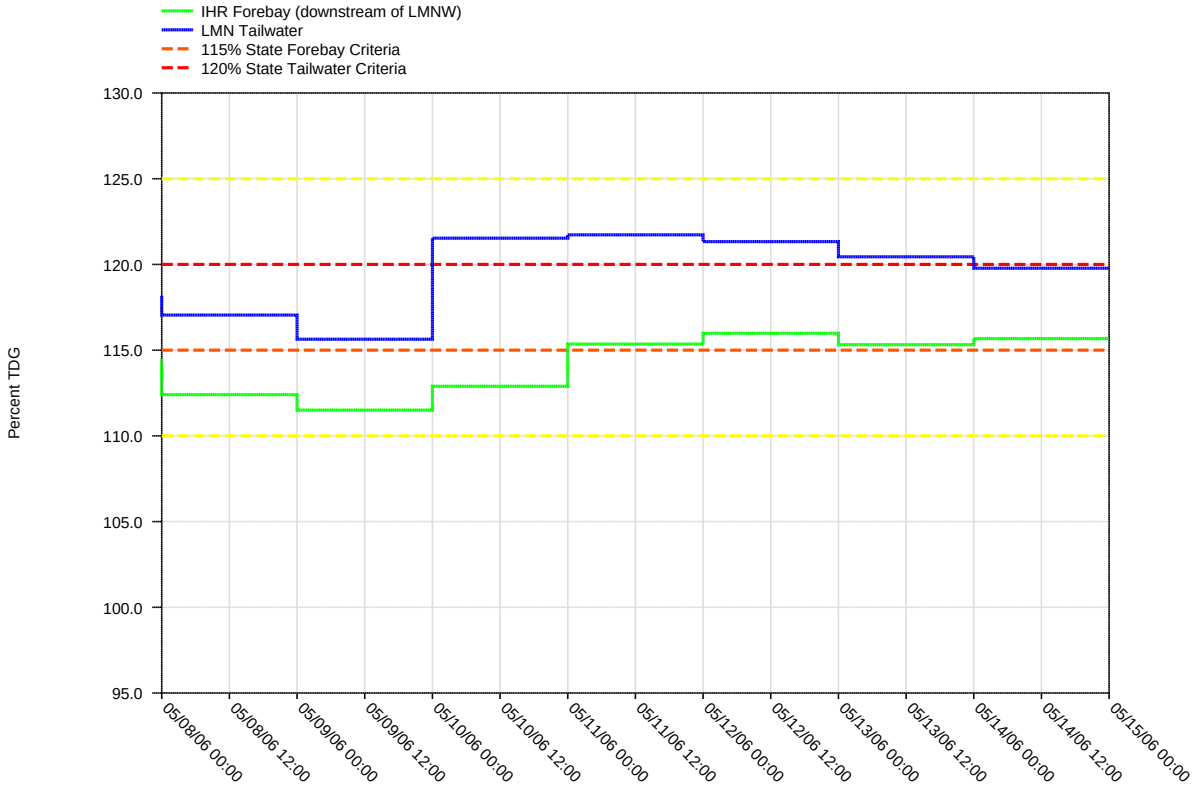
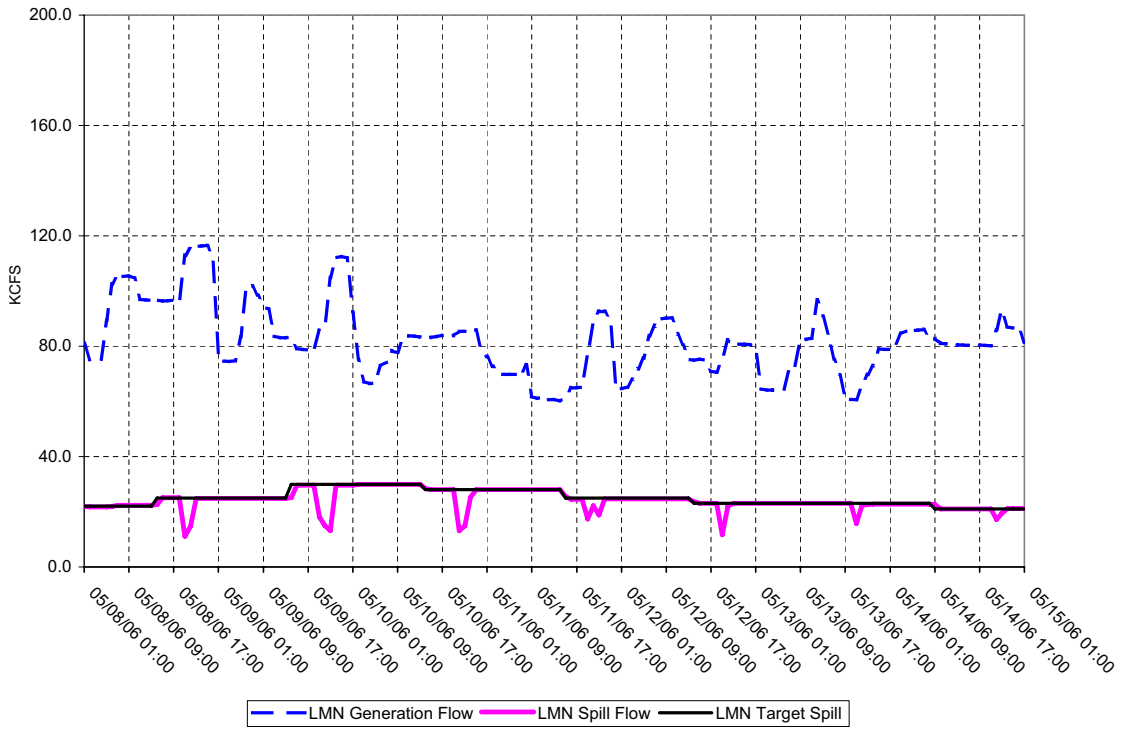


Figure 11.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



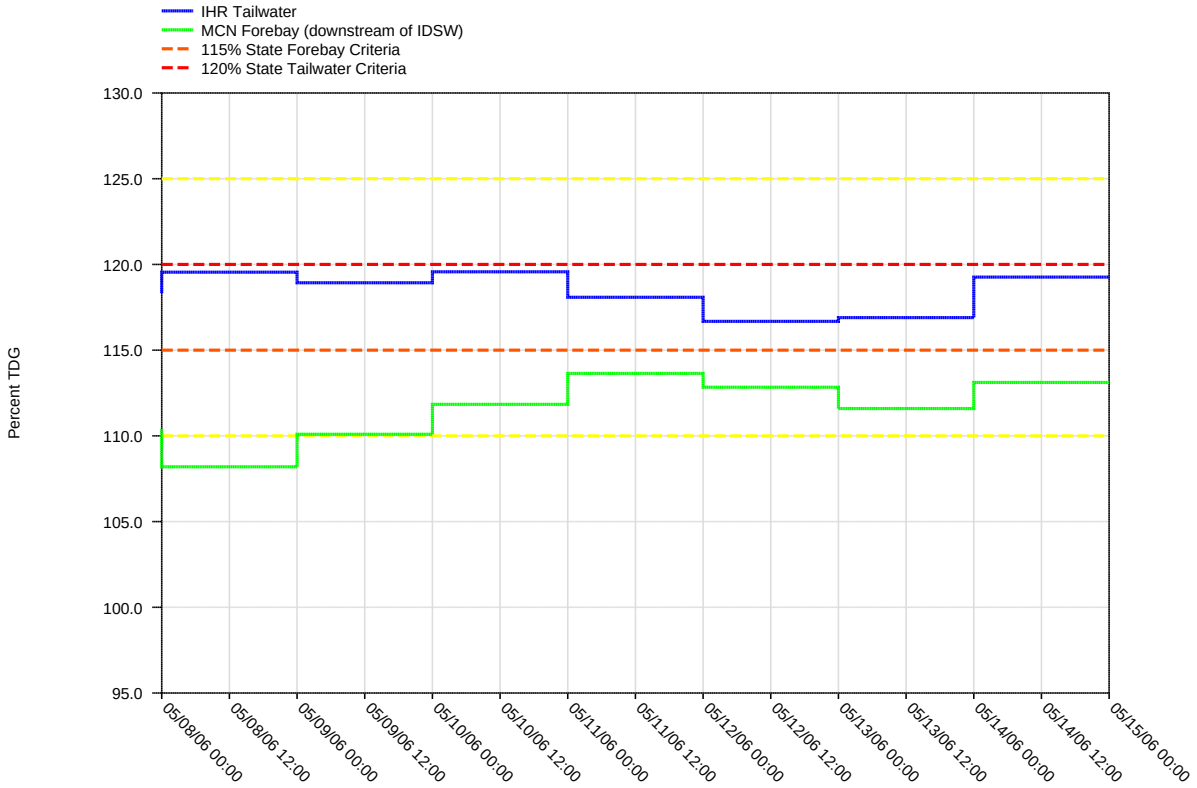
LOWER MONUMENTAL DAM - Hourly Spill and Flow



Planned Spill in FPIP is 40 kcfs

Figure 12.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

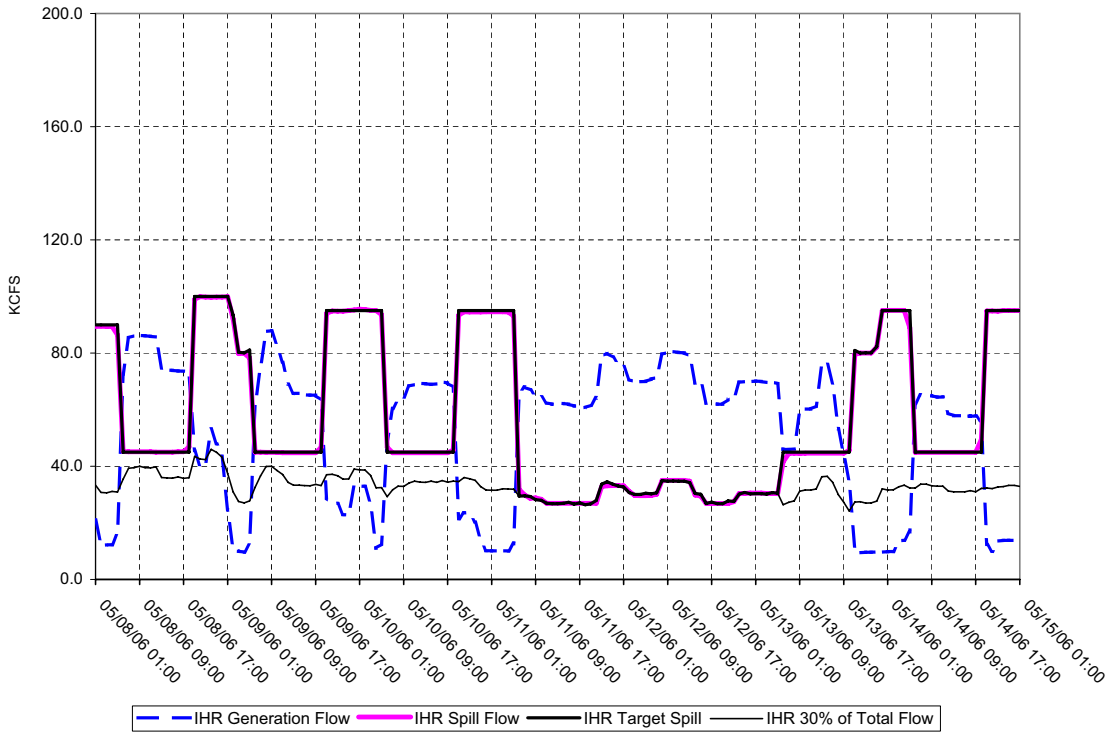
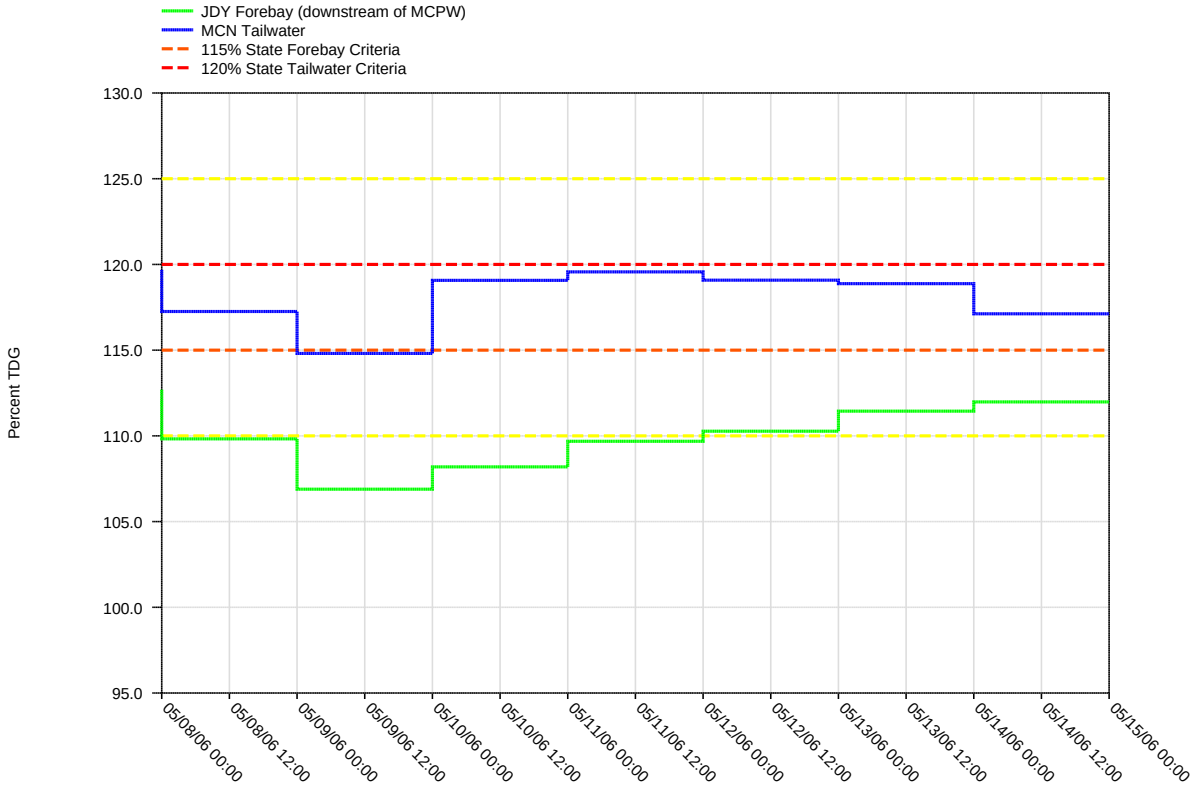


Figure 13.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

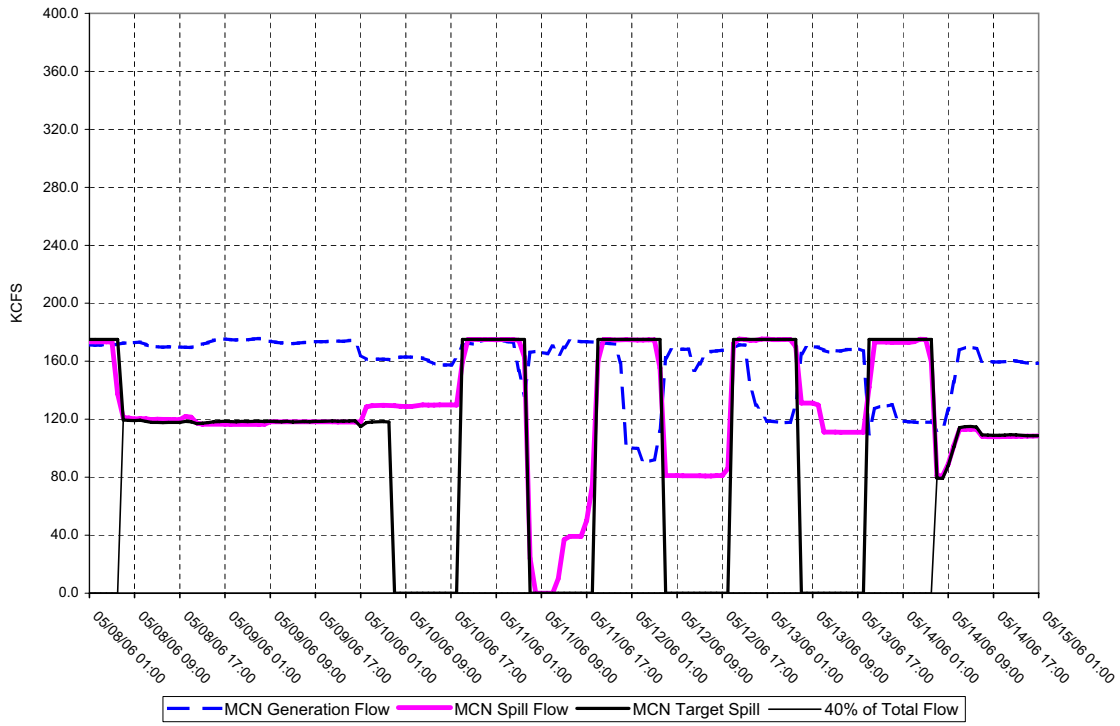
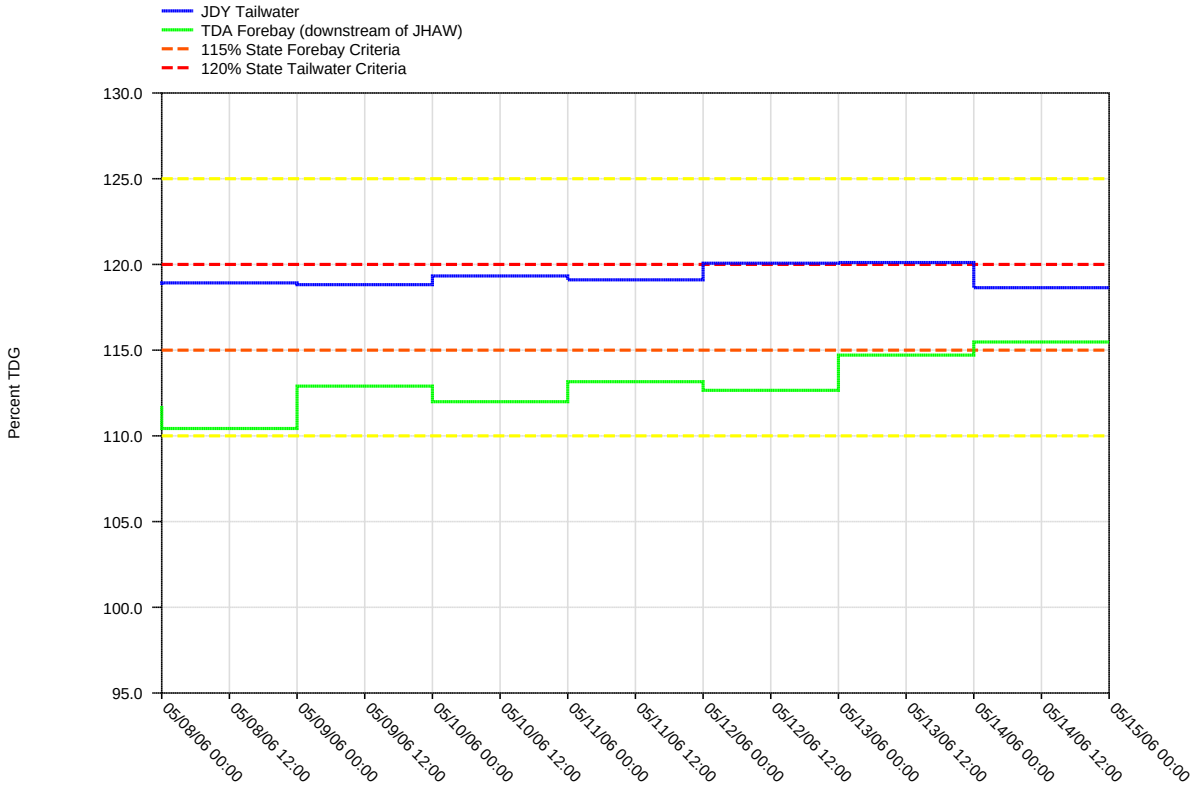


Figure 14.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

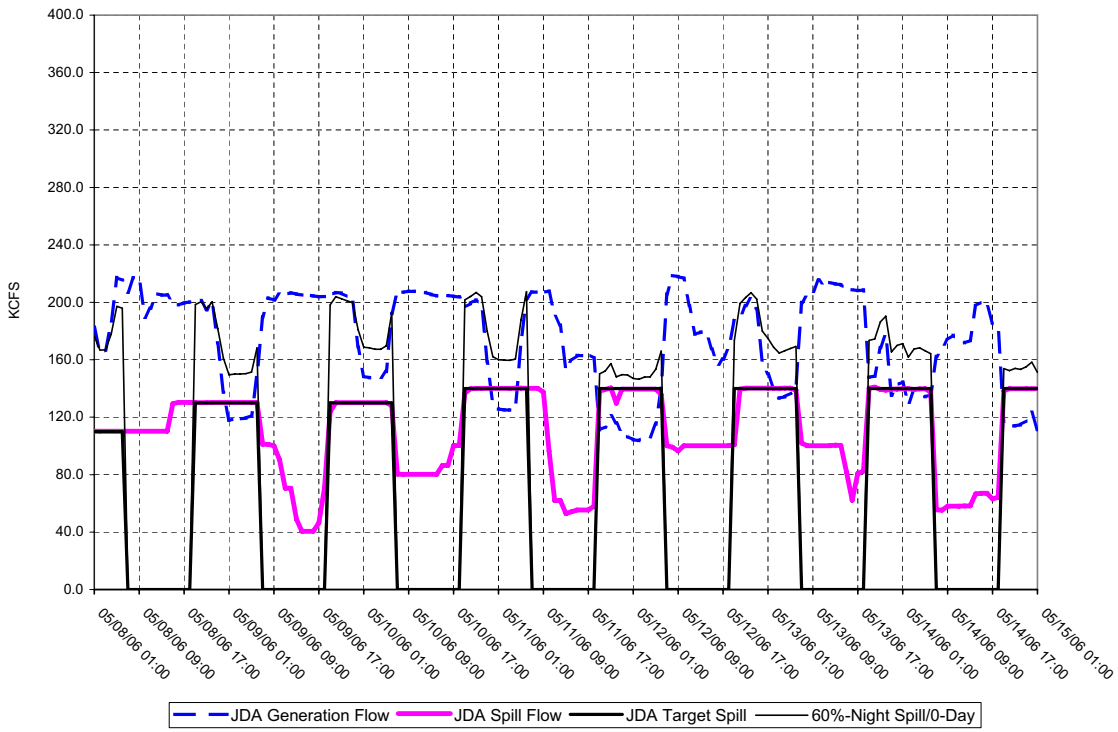
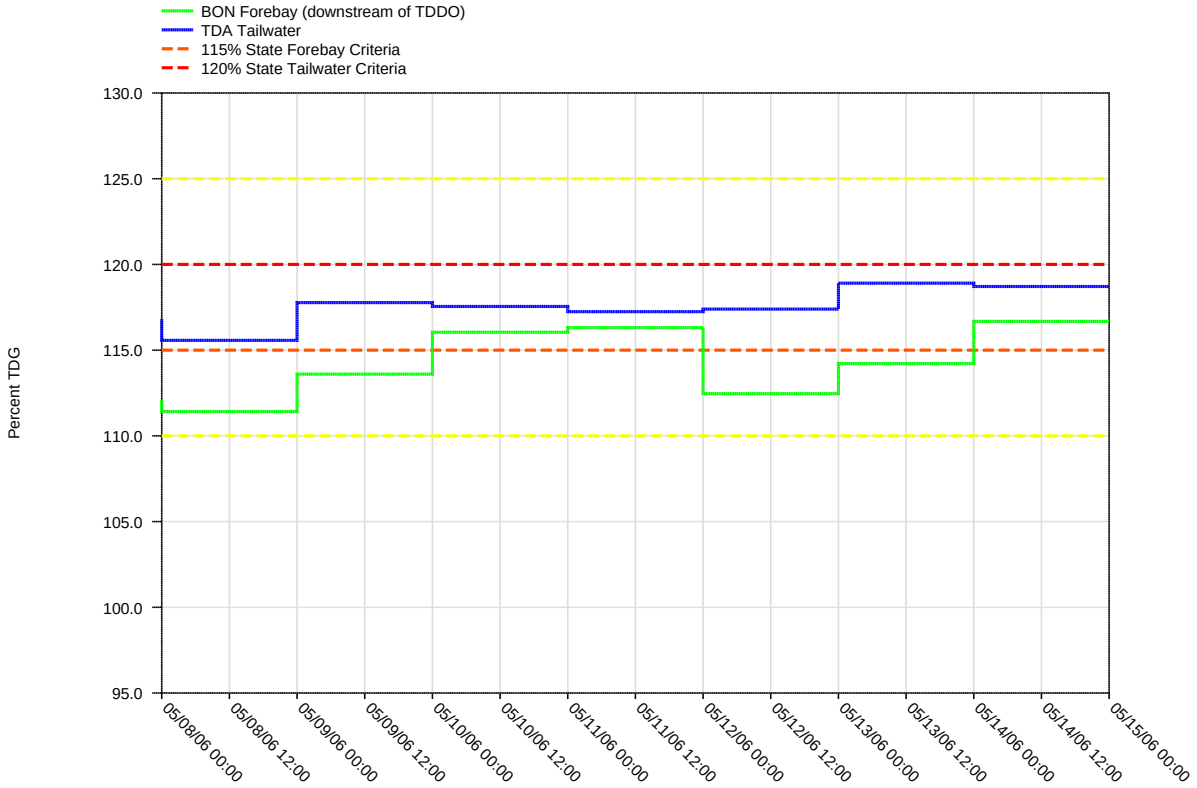


Figure 15.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

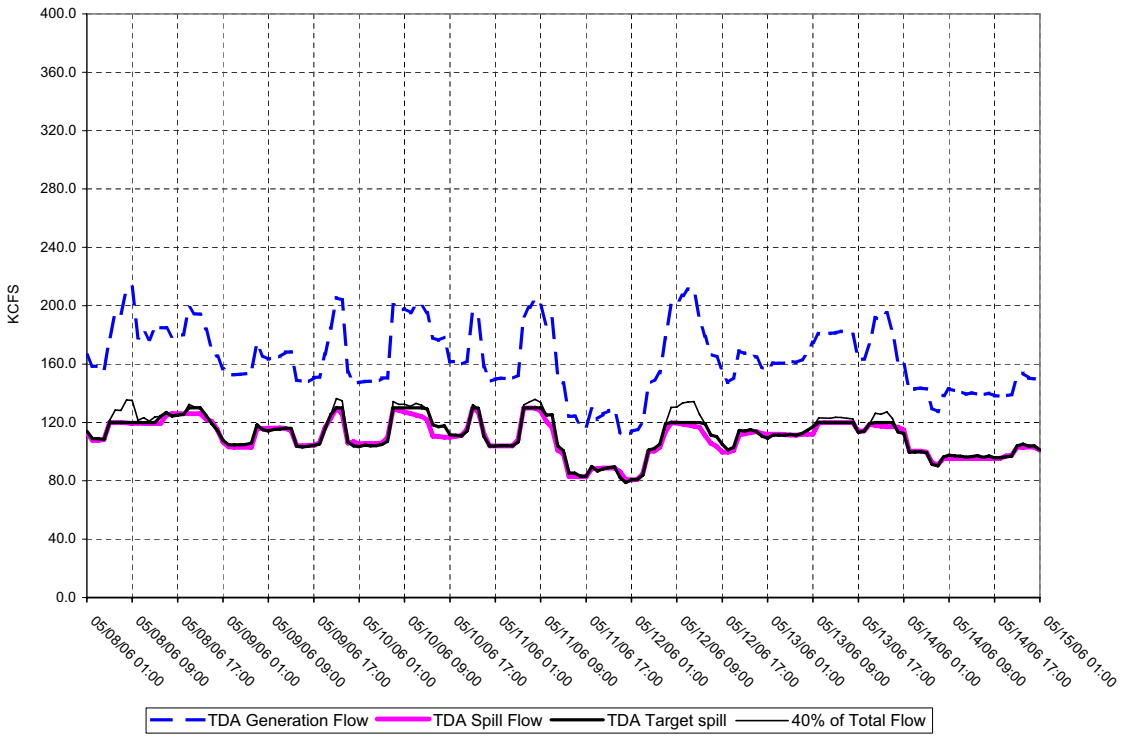
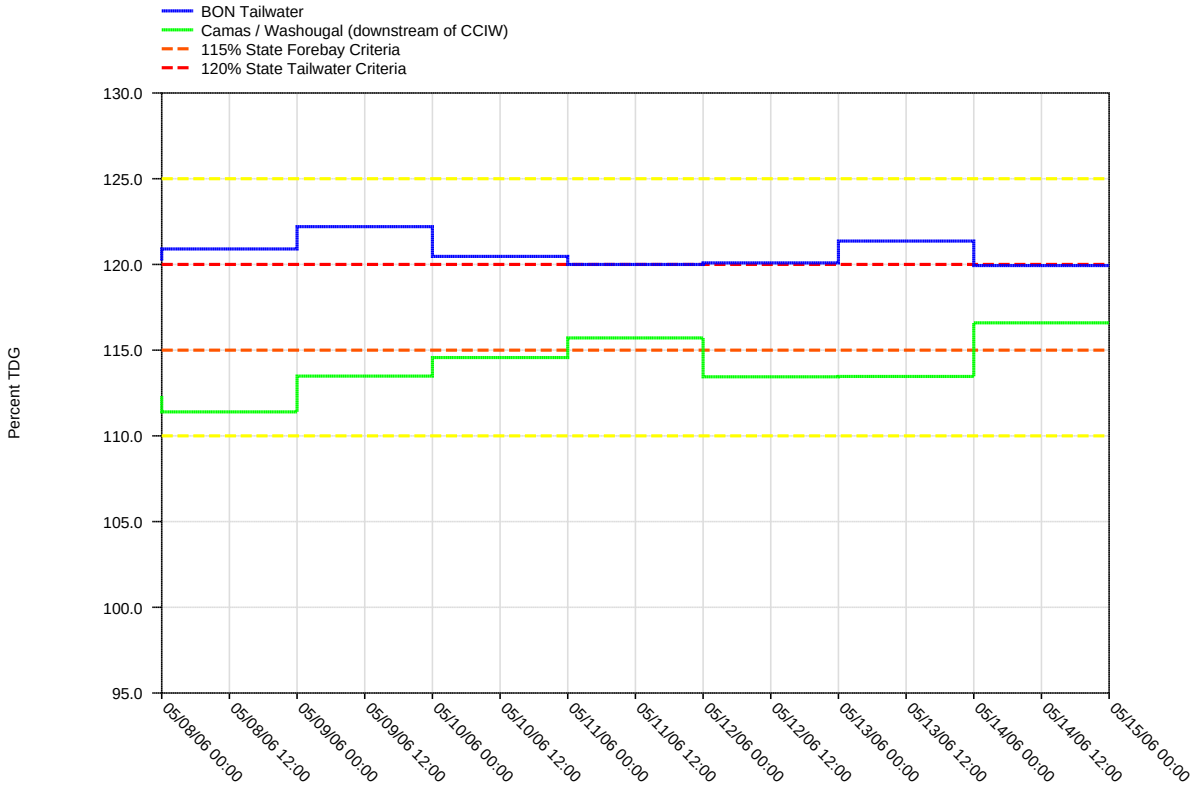
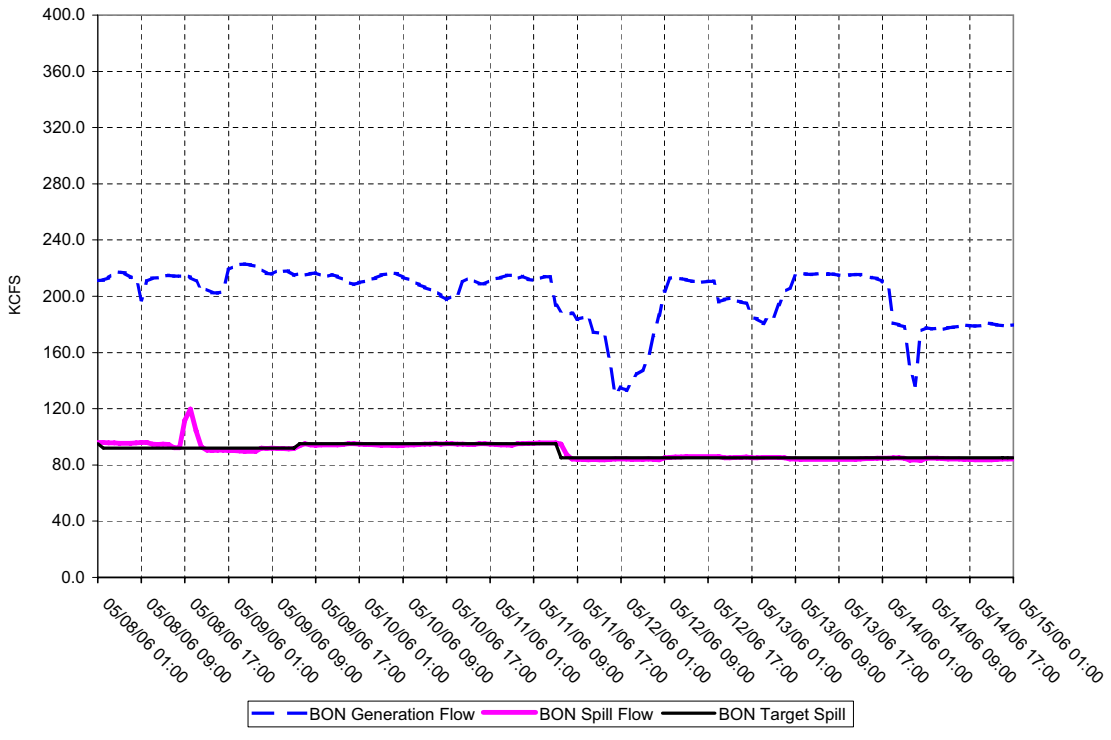


Figure 16.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



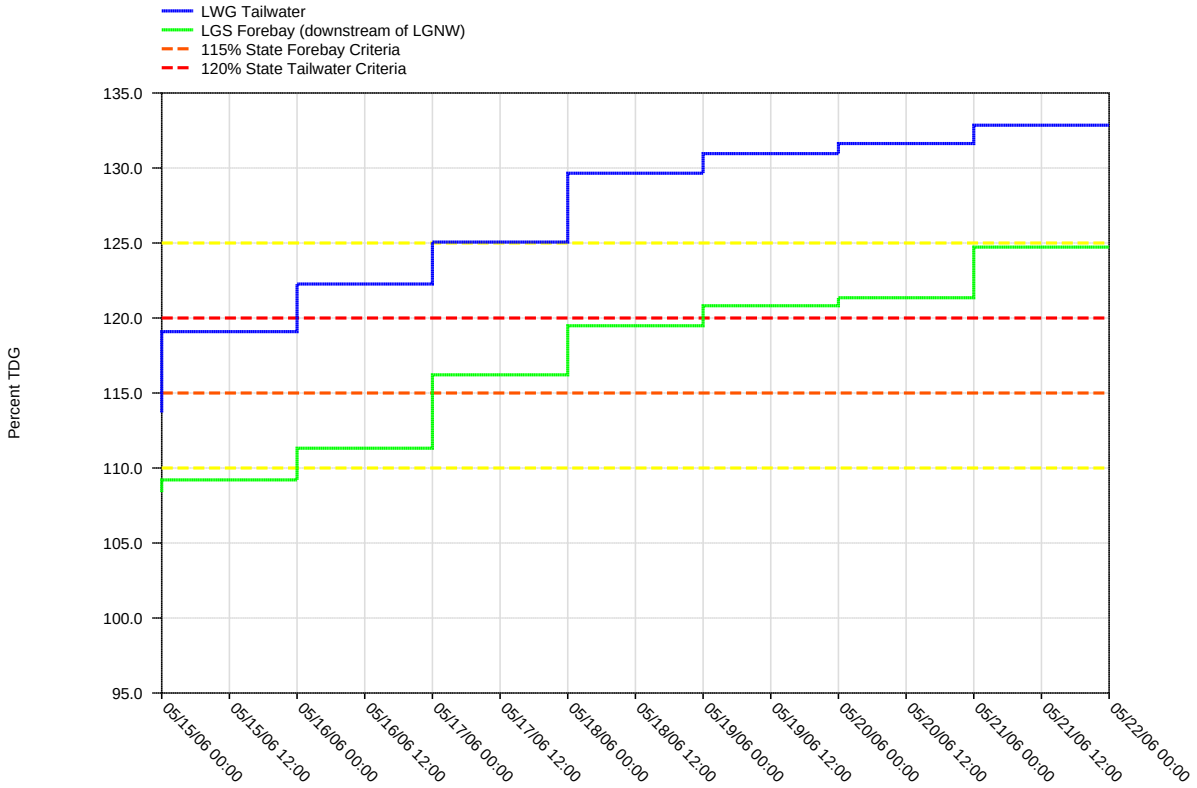
BONNEVILLE DAM - Hourly Spill and Flow



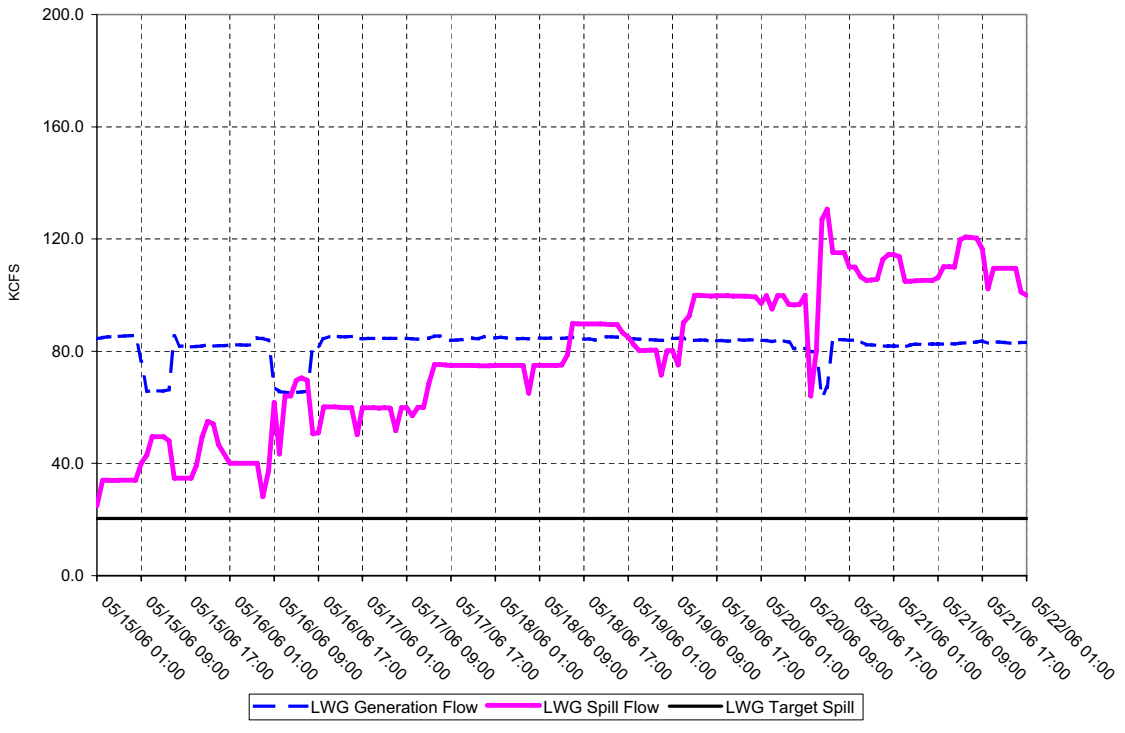
Planned Spill in FPIP is 100 kcfs

Figure 17.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



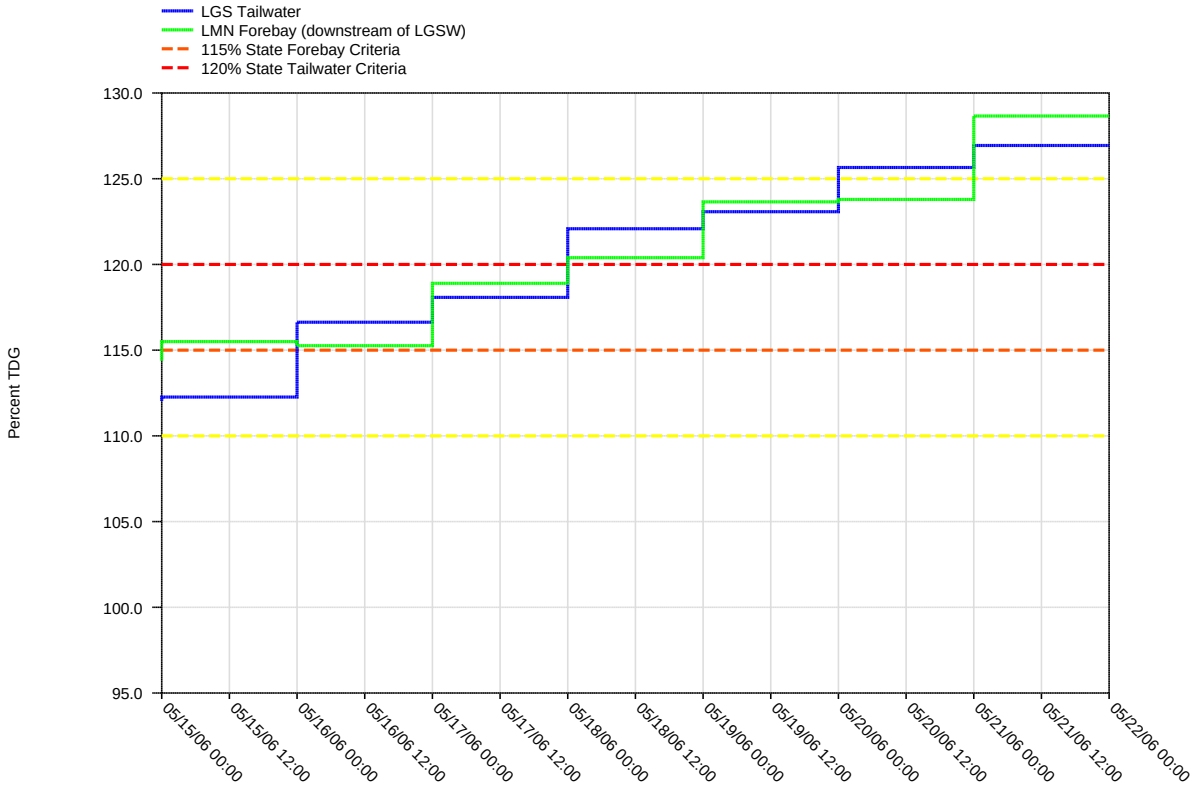
LOWER GRANITE DAM - Hourly Spill and Flow



Planned Spill in FPIP is 20 kcfs

Figure 18.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

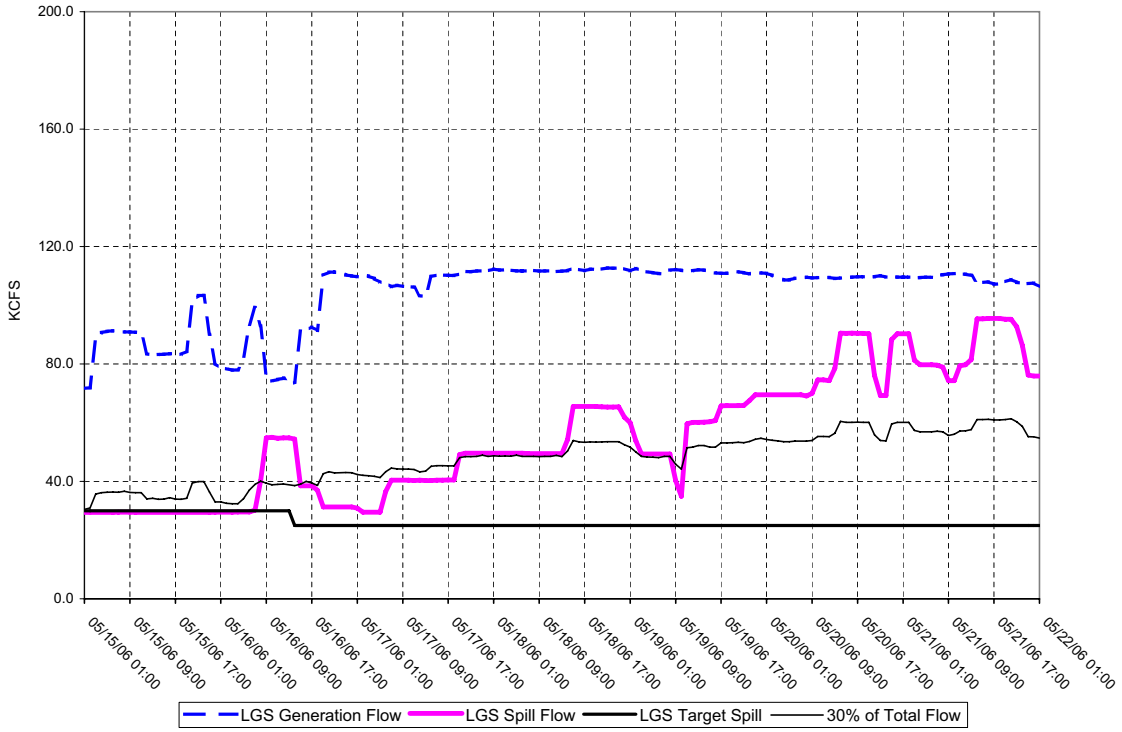
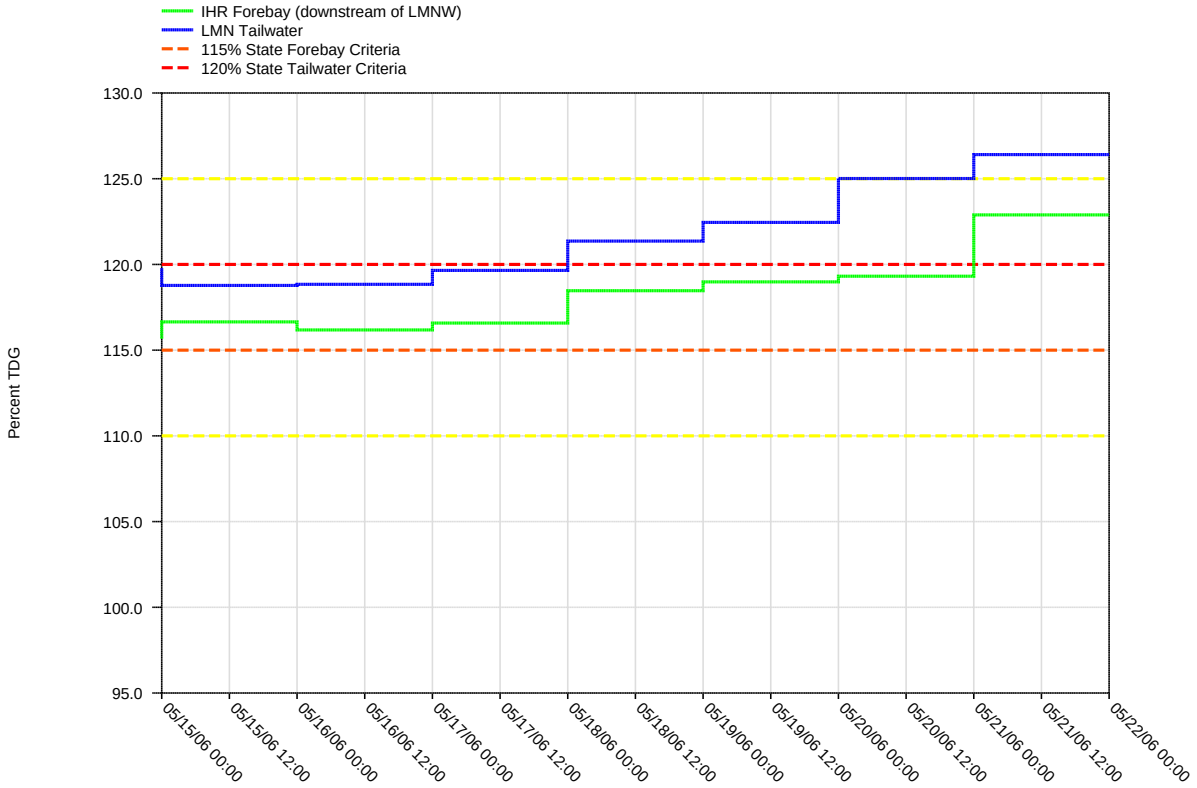
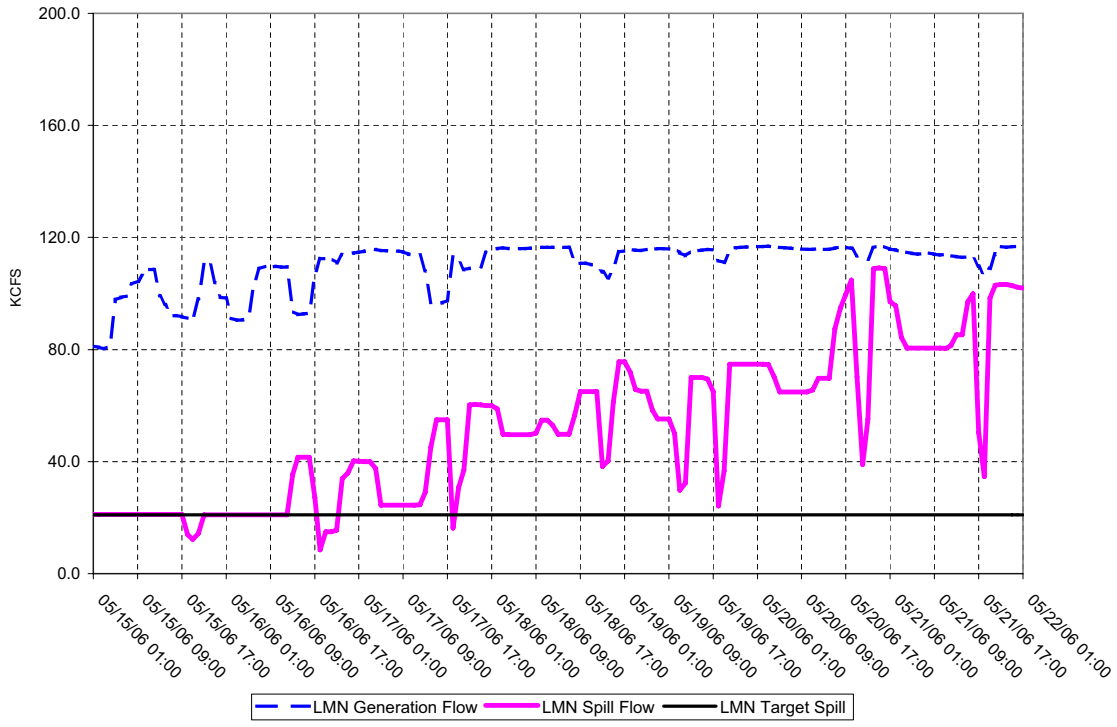


Figure 19.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



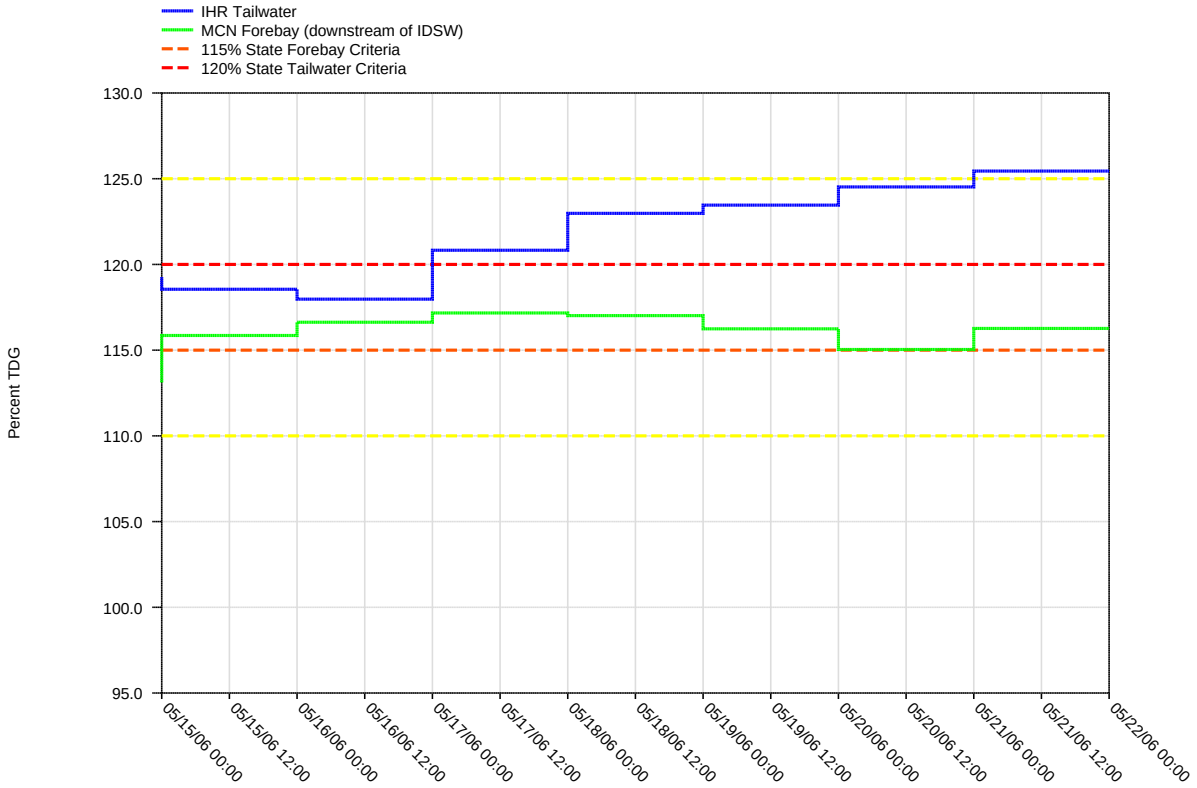
LOWER MONUMENTAL DAM - Hourly Spill and Flow



Planned Spill in FPIP is 40 kcfs

Figure 20.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

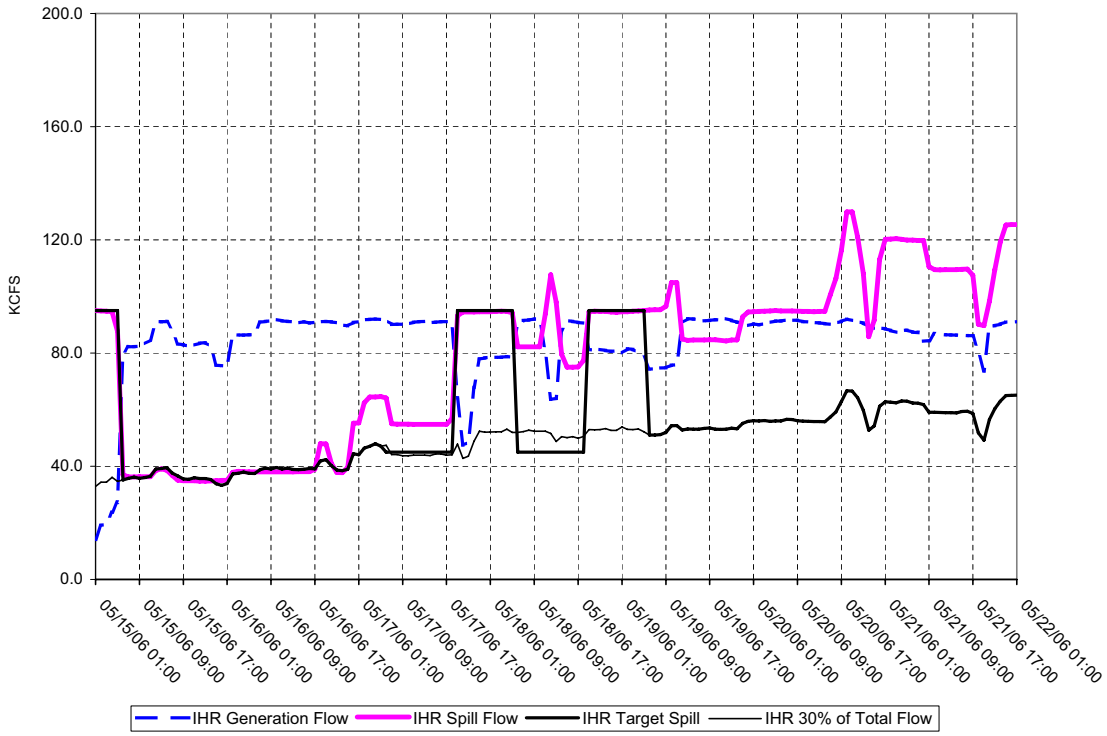
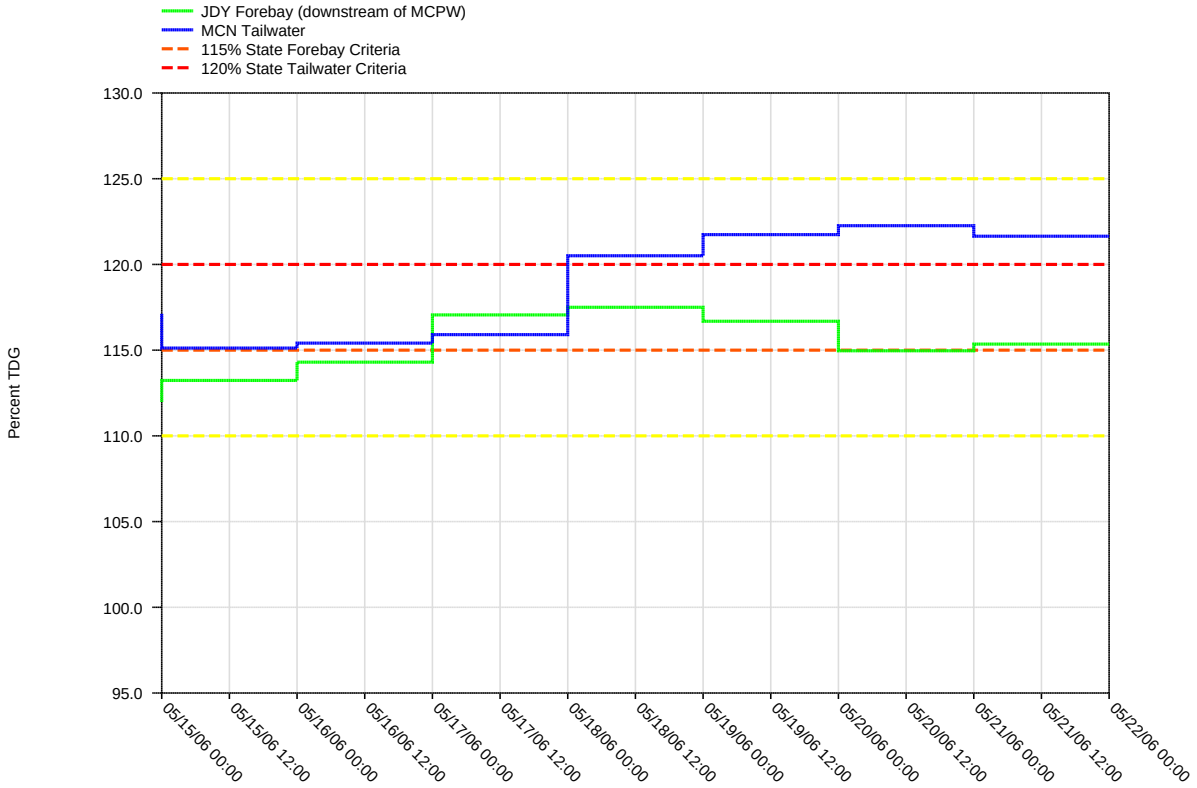


Figure 21.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

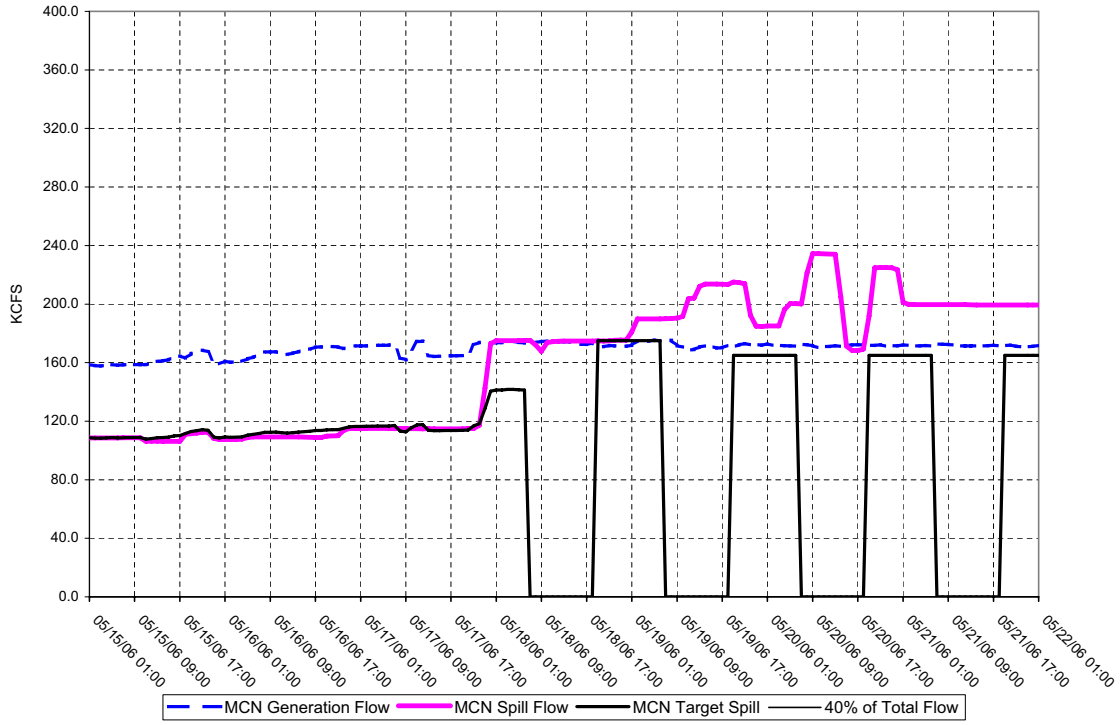
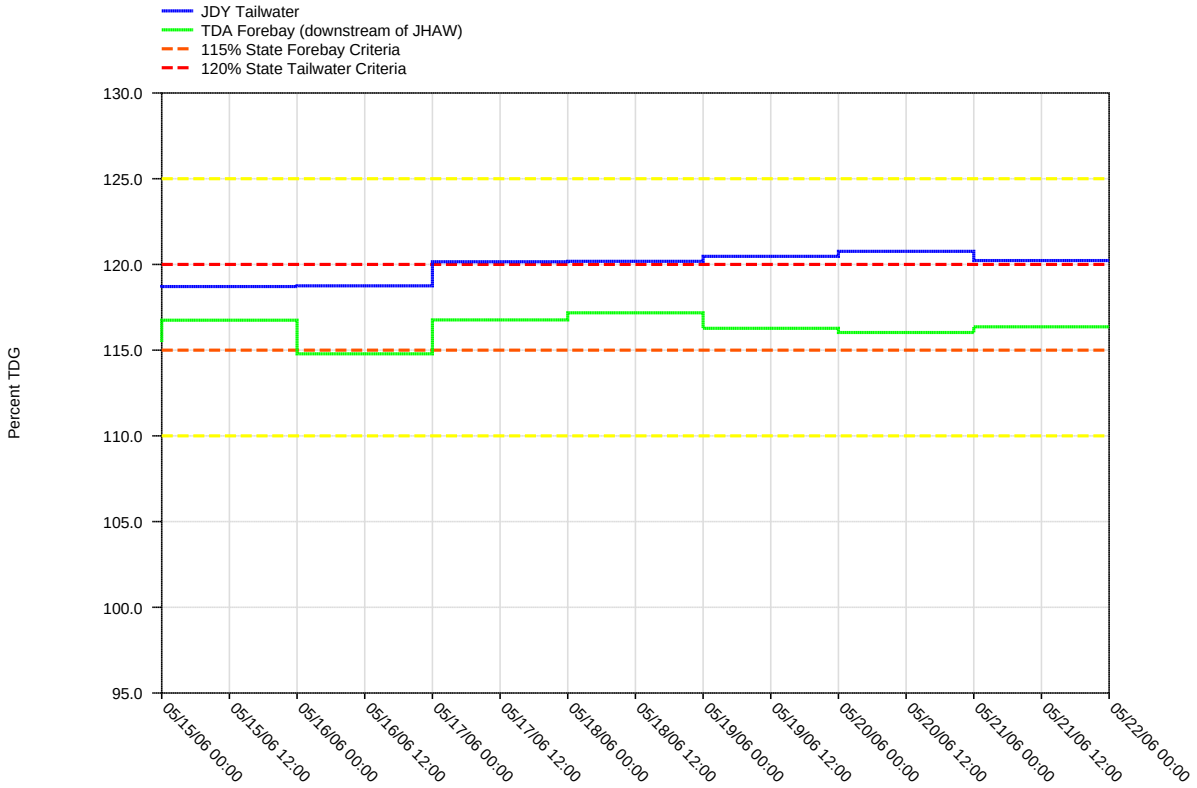


Figure 22.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

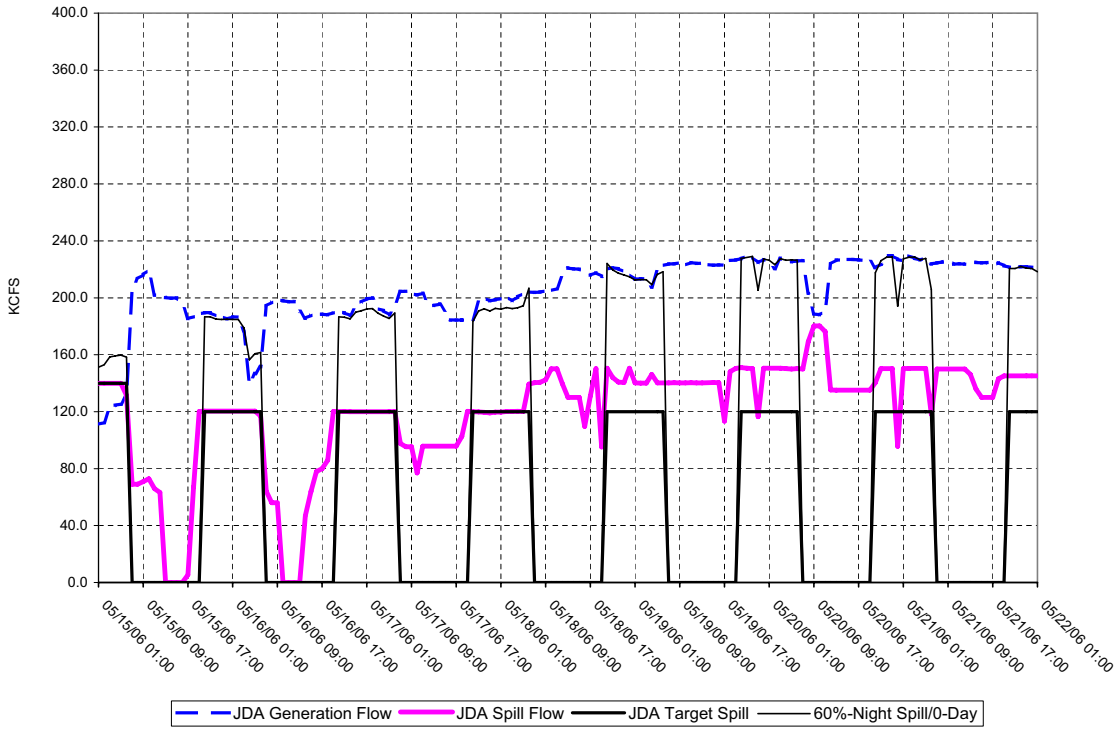
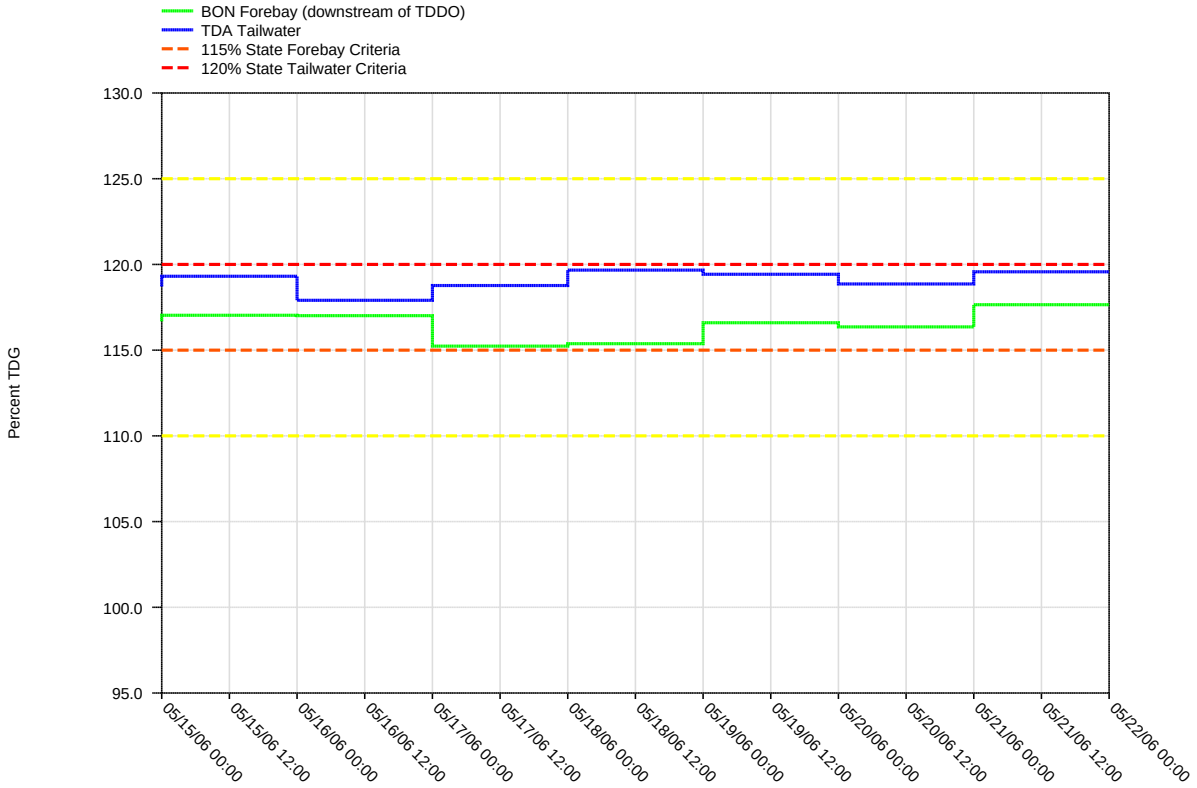


Figure 23.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

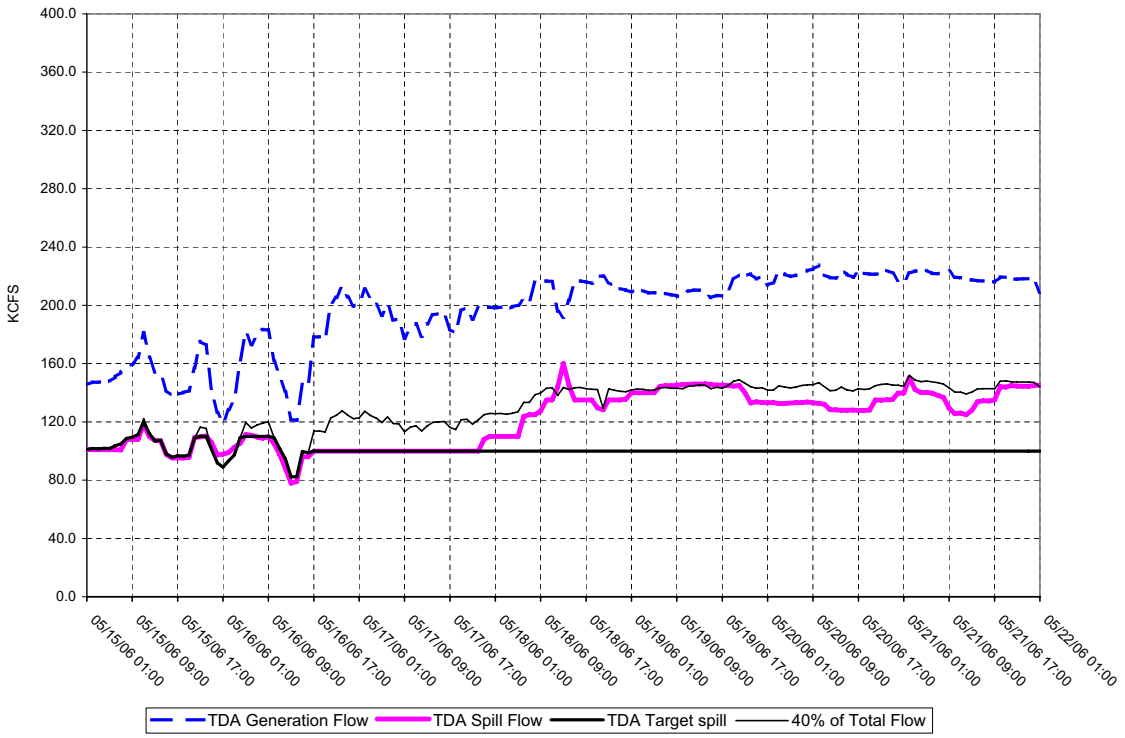
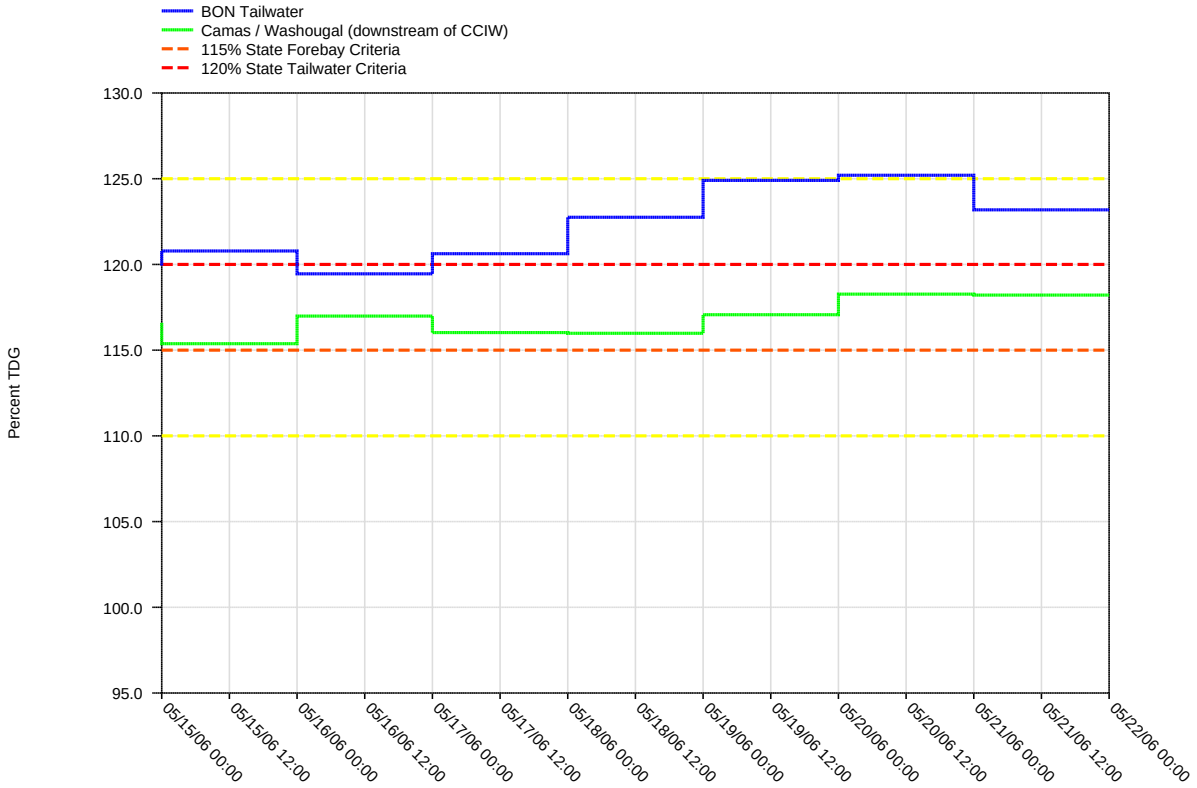
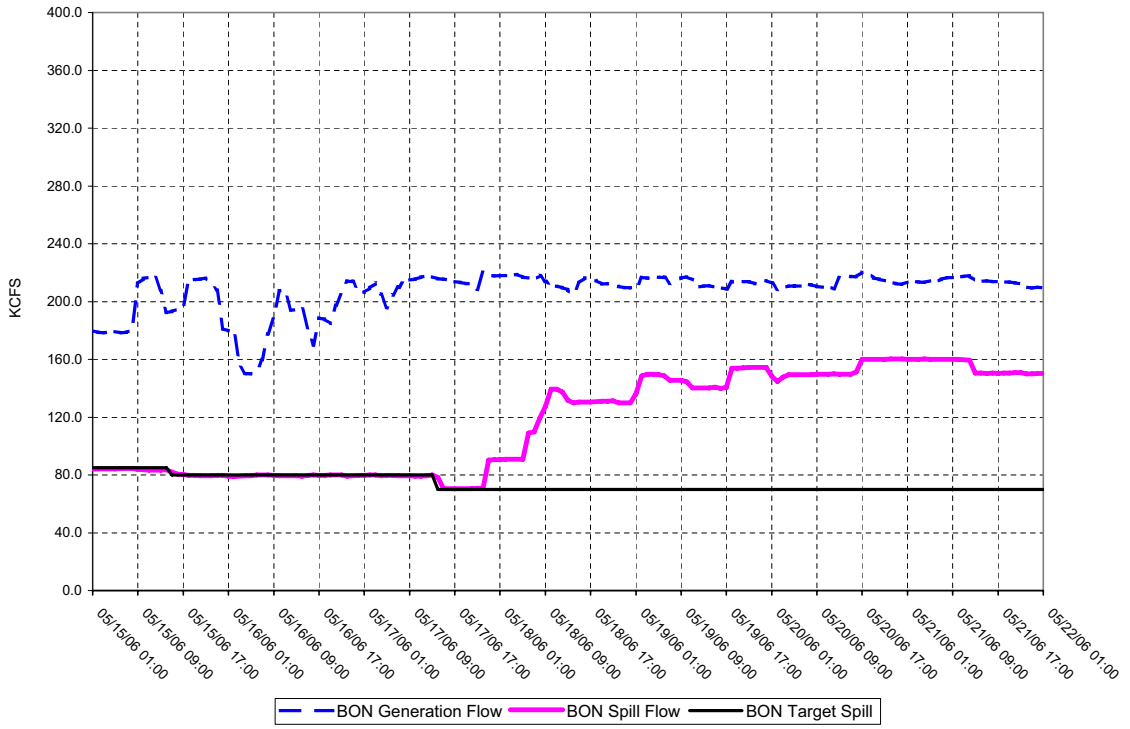


Figure 24.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



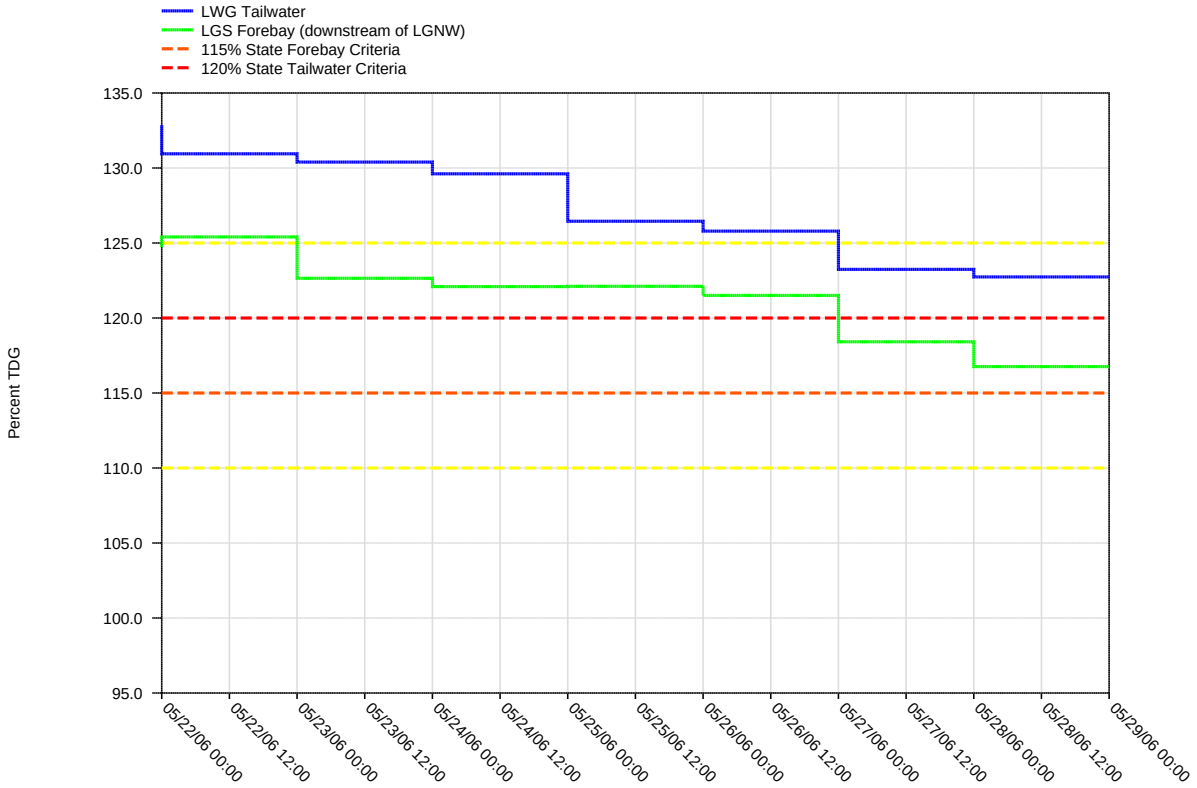
BONNEVILLE DAM - Hourly Spill and Flow



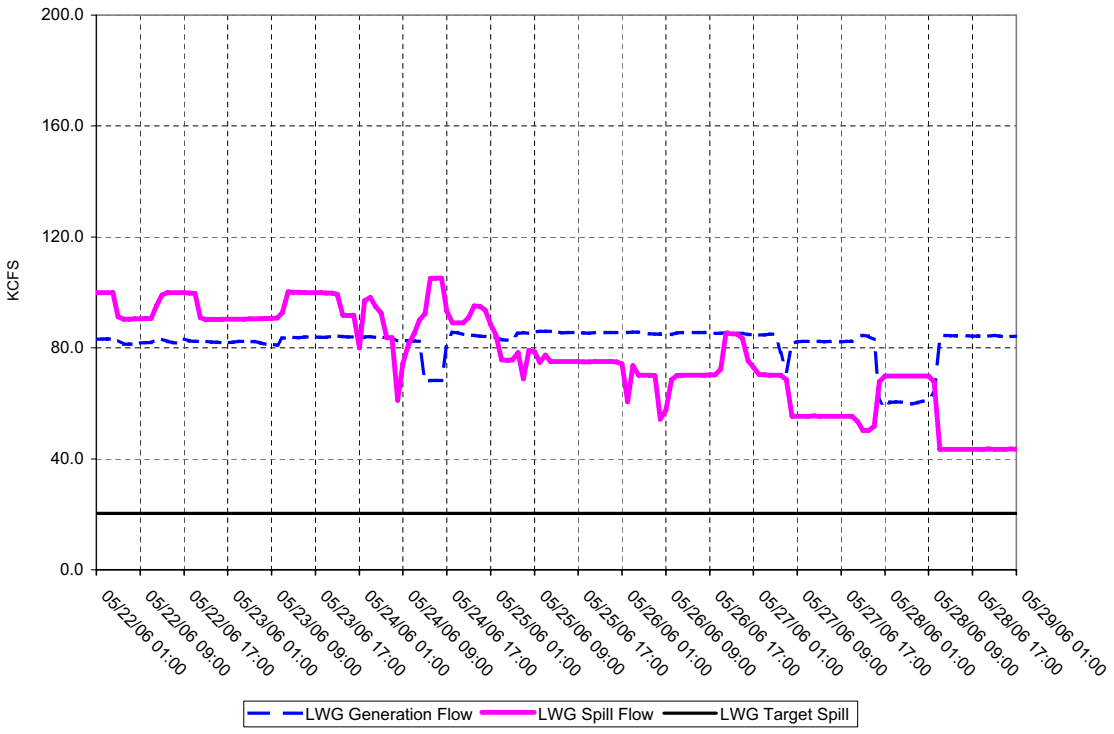
Planned Spill in FPIP is 100 kcfs

Figure 25.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



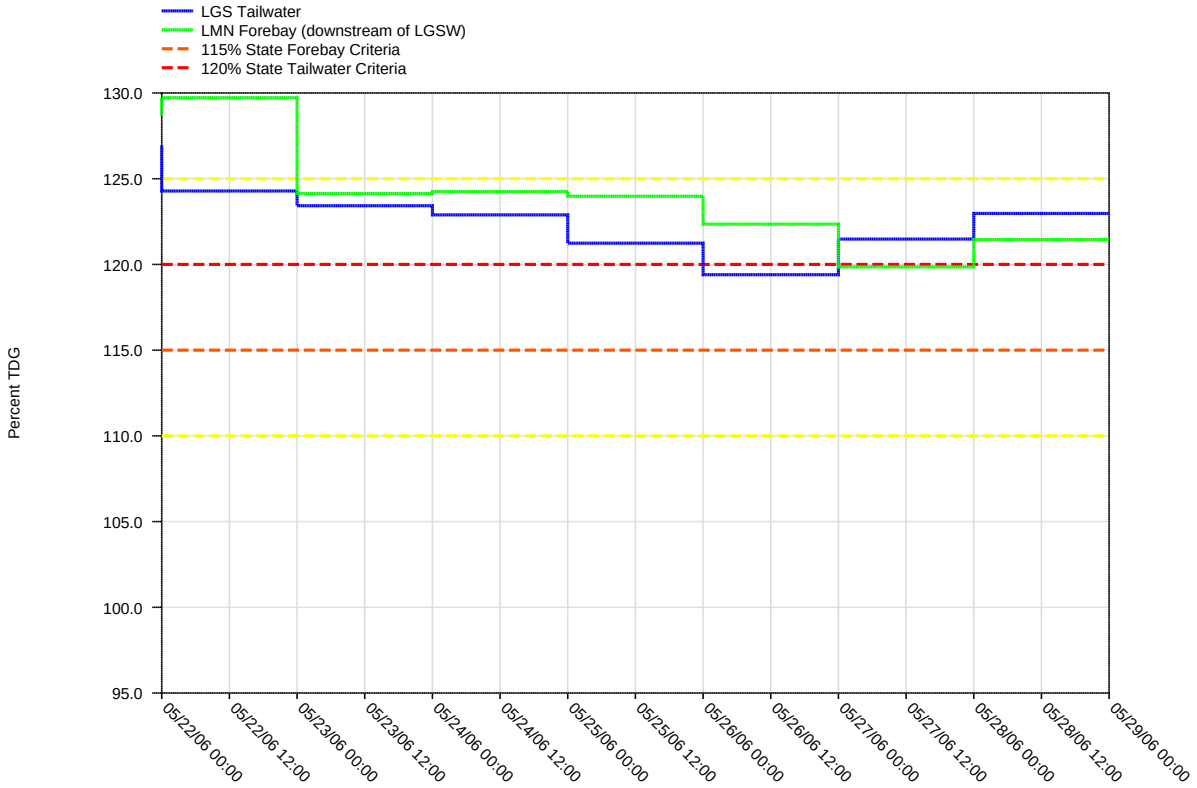
LOWER GRANITE DAM - Hourly Spill and Flow



Planned Spill in FPIP is 20 kcfs

Figure 26.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

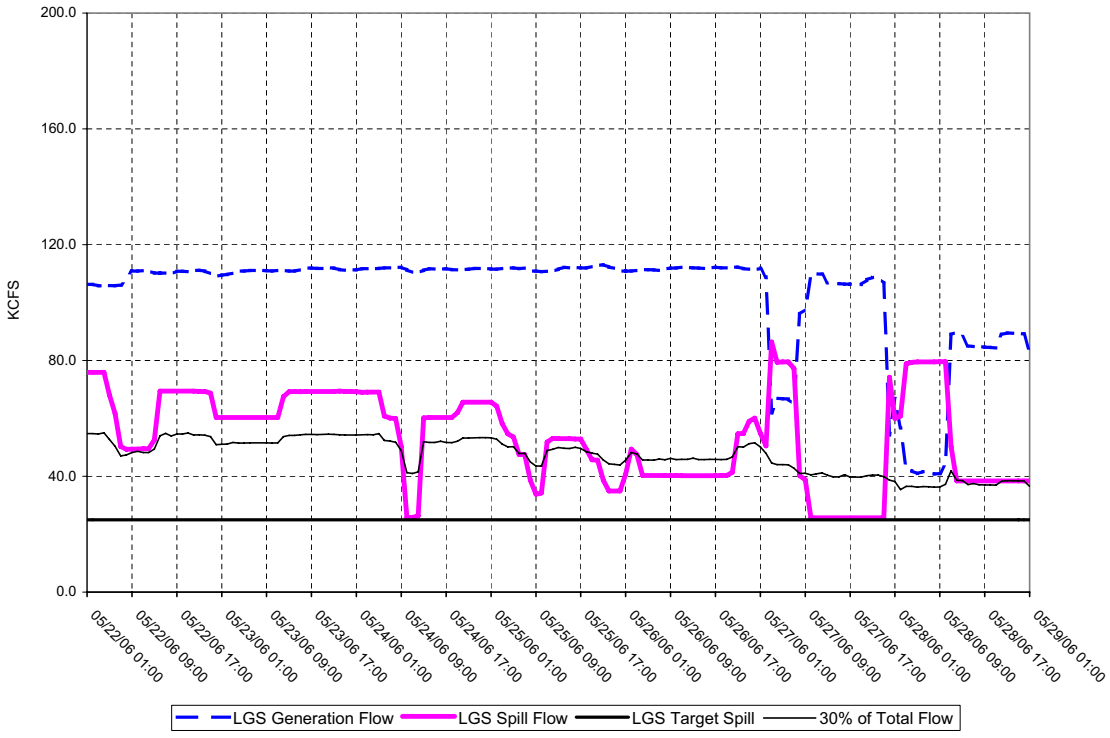
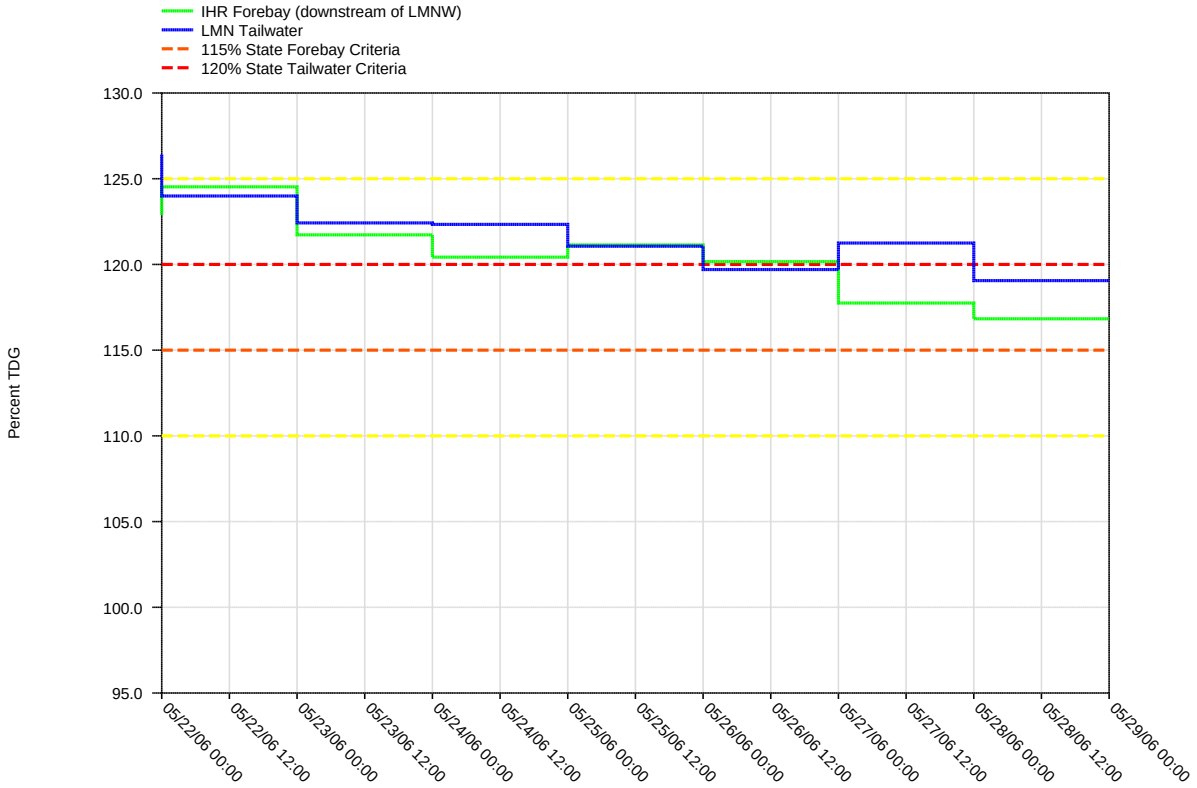
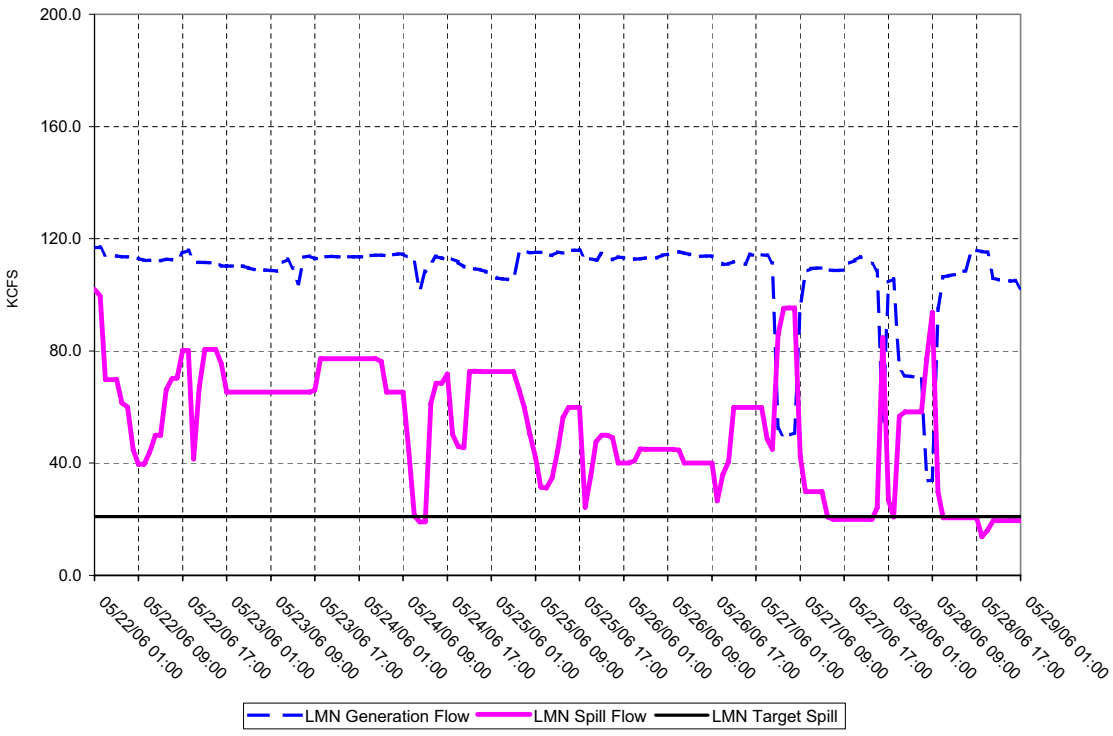


Figure 27.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



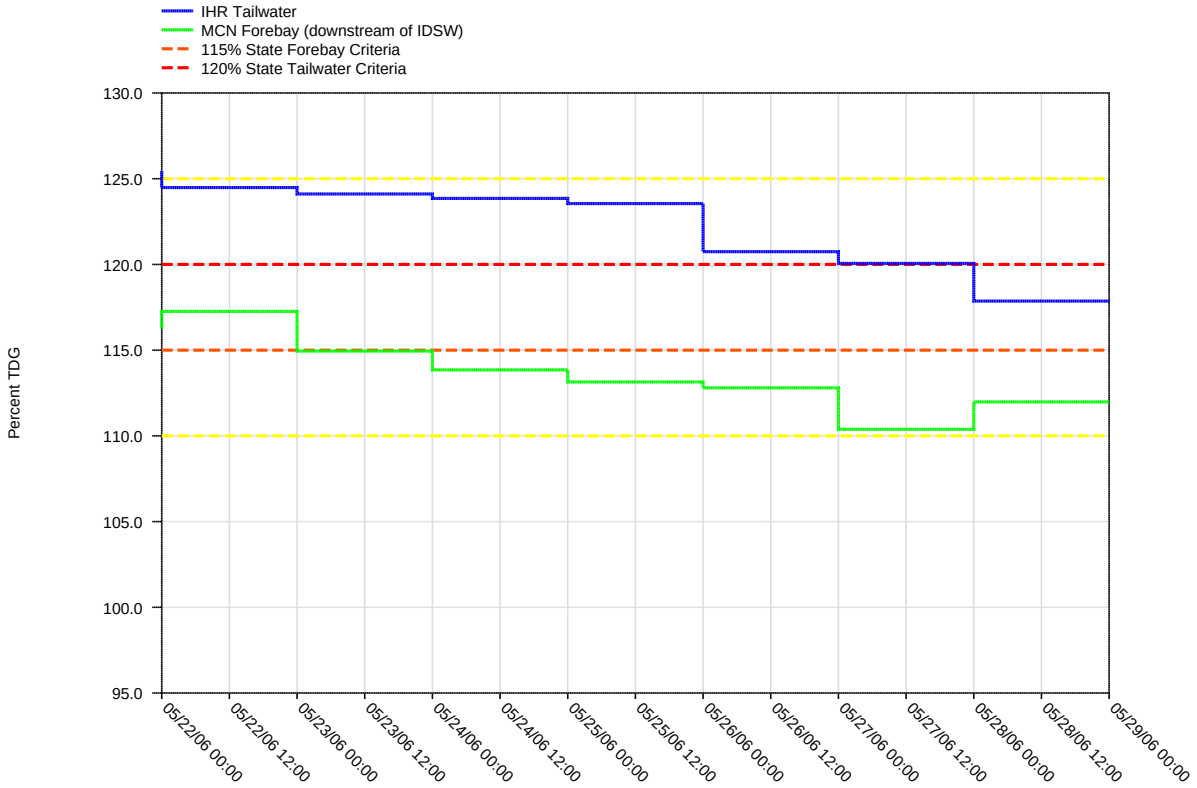
LOWER MONUMENTAL DAM - Hourly Spill and Flow



Planned Spill in FPIP is 40 kcfs

Figure 28.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

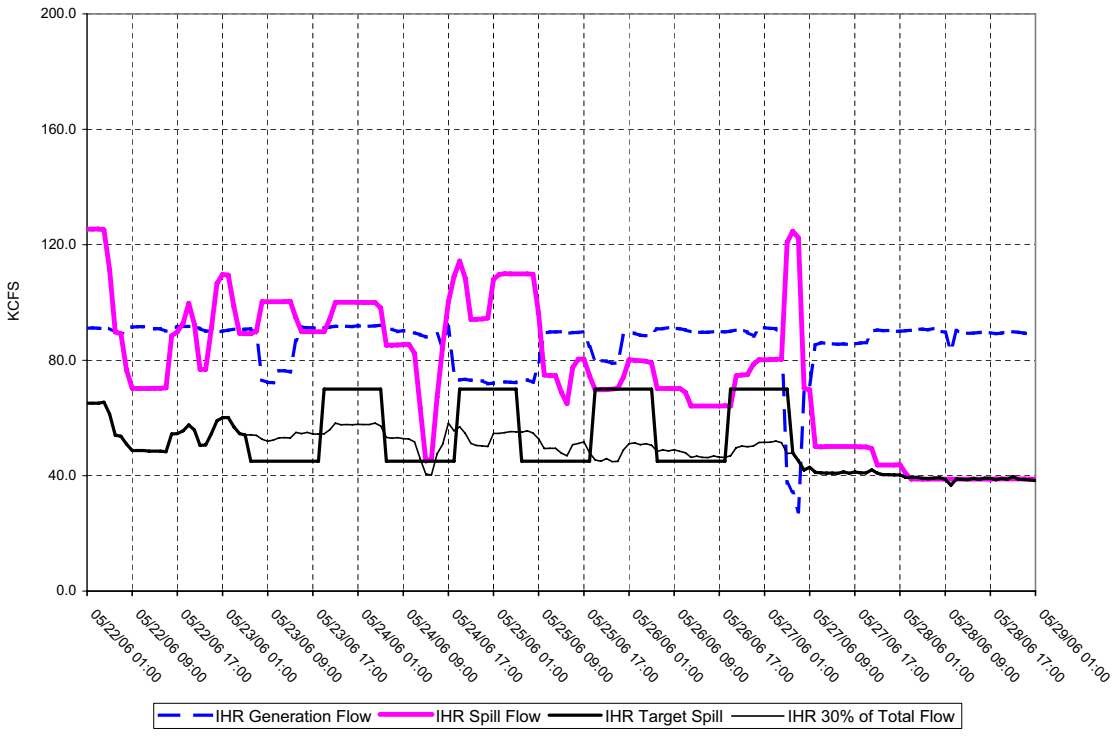
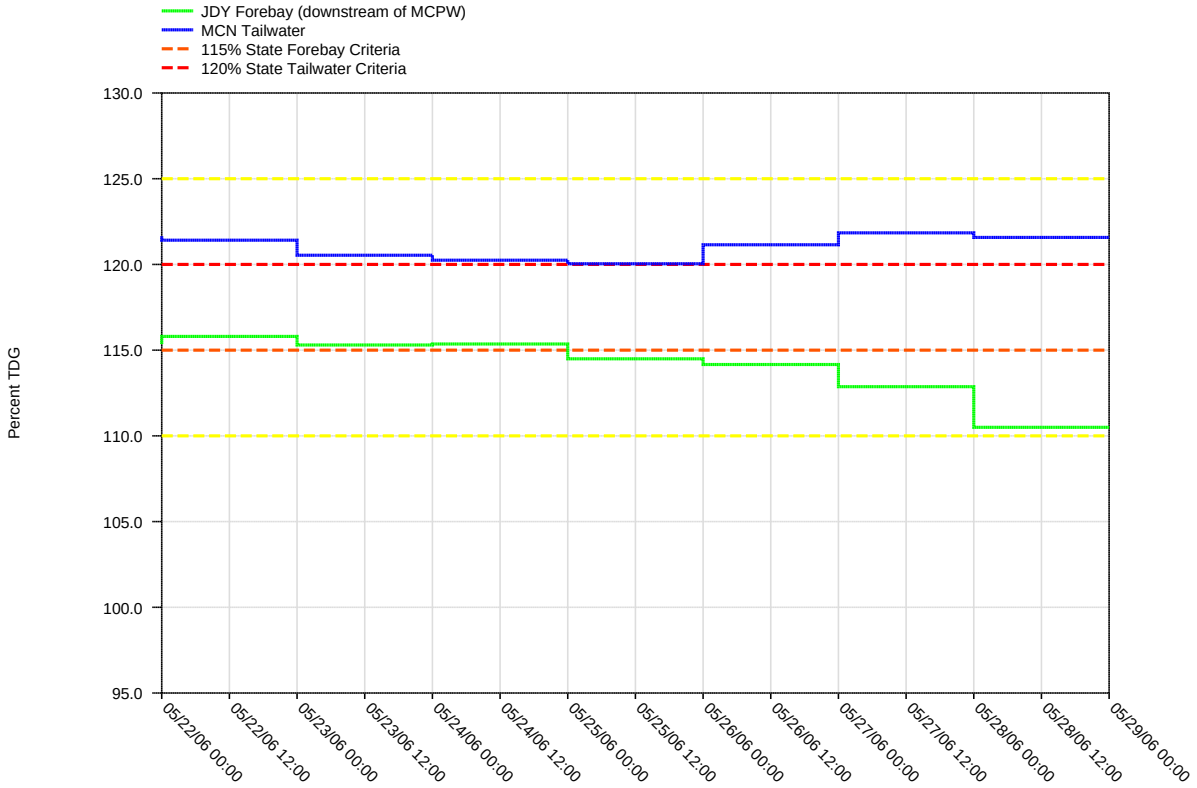


Figure 29.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

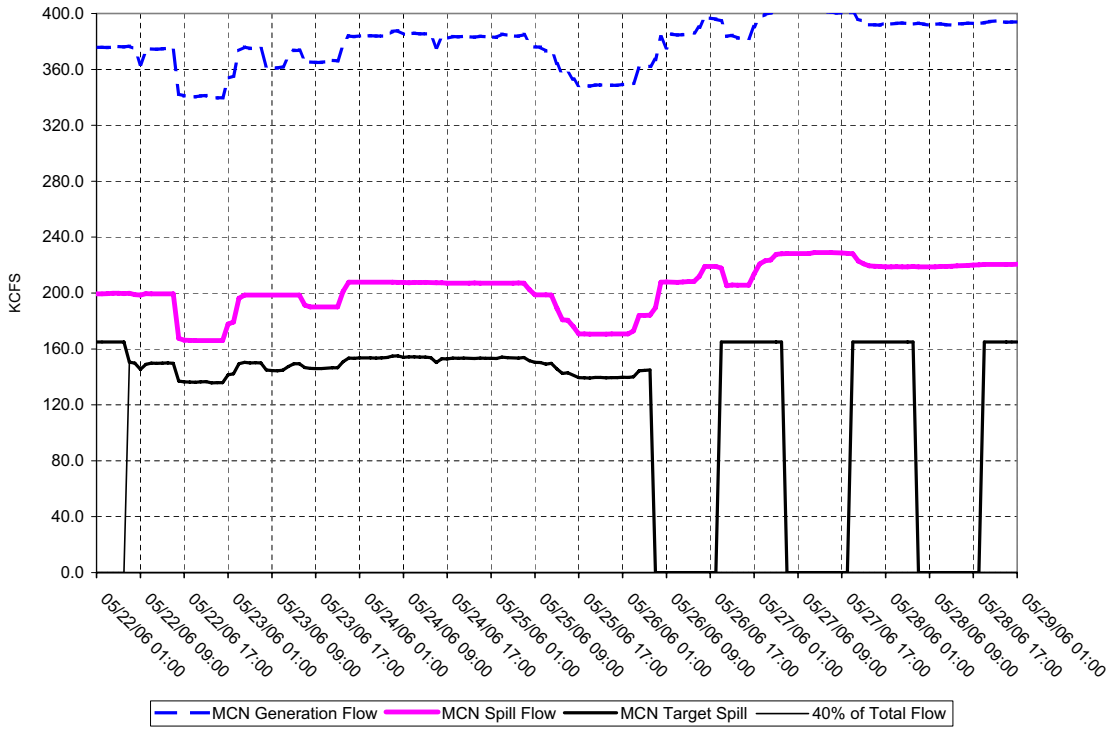
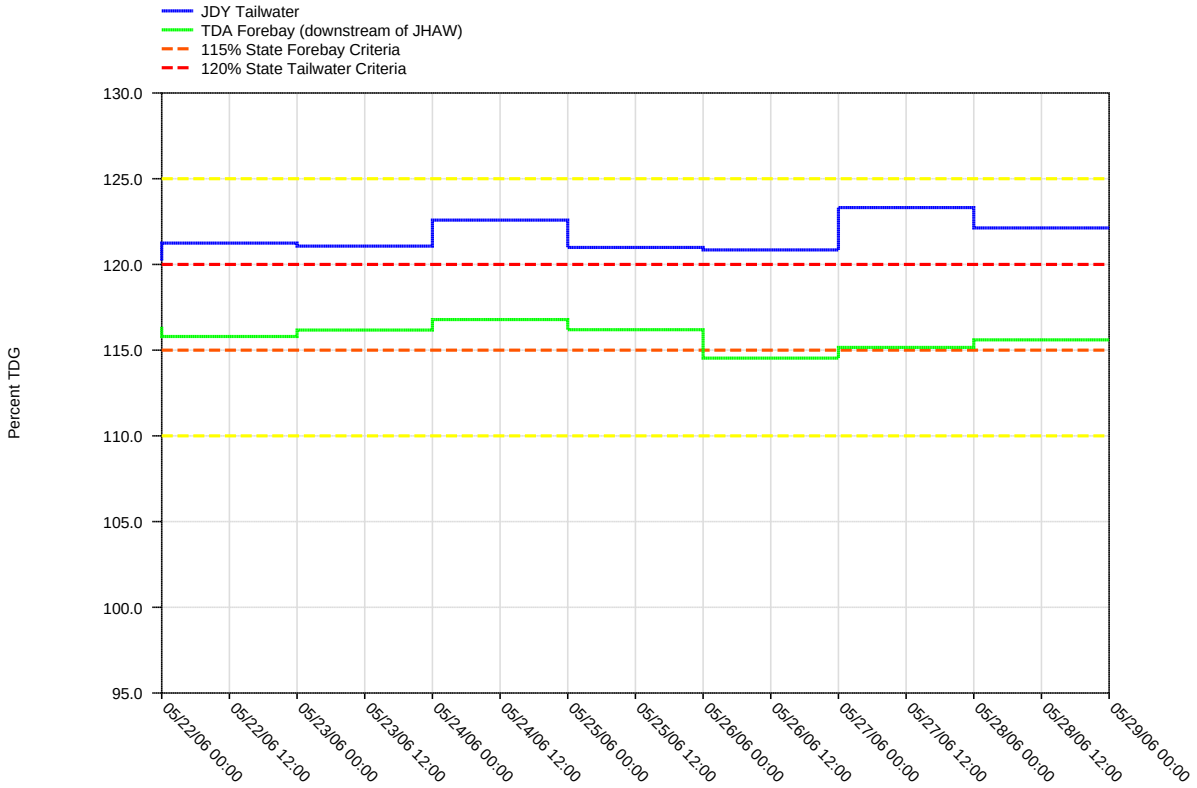


Figure 30.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

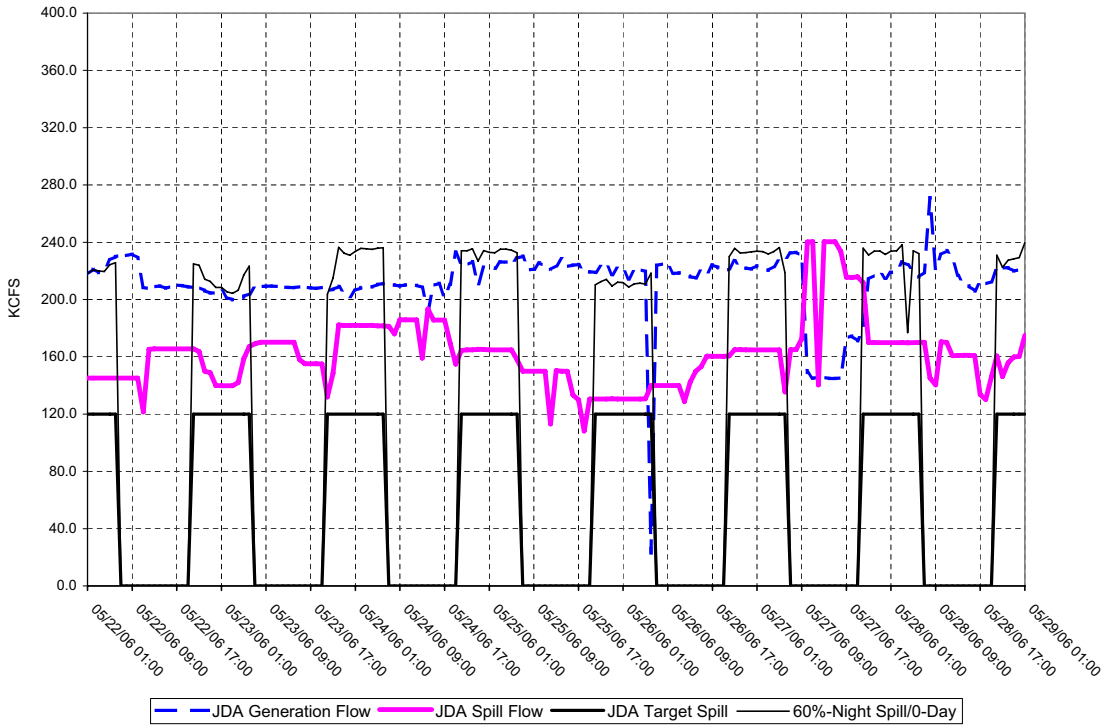
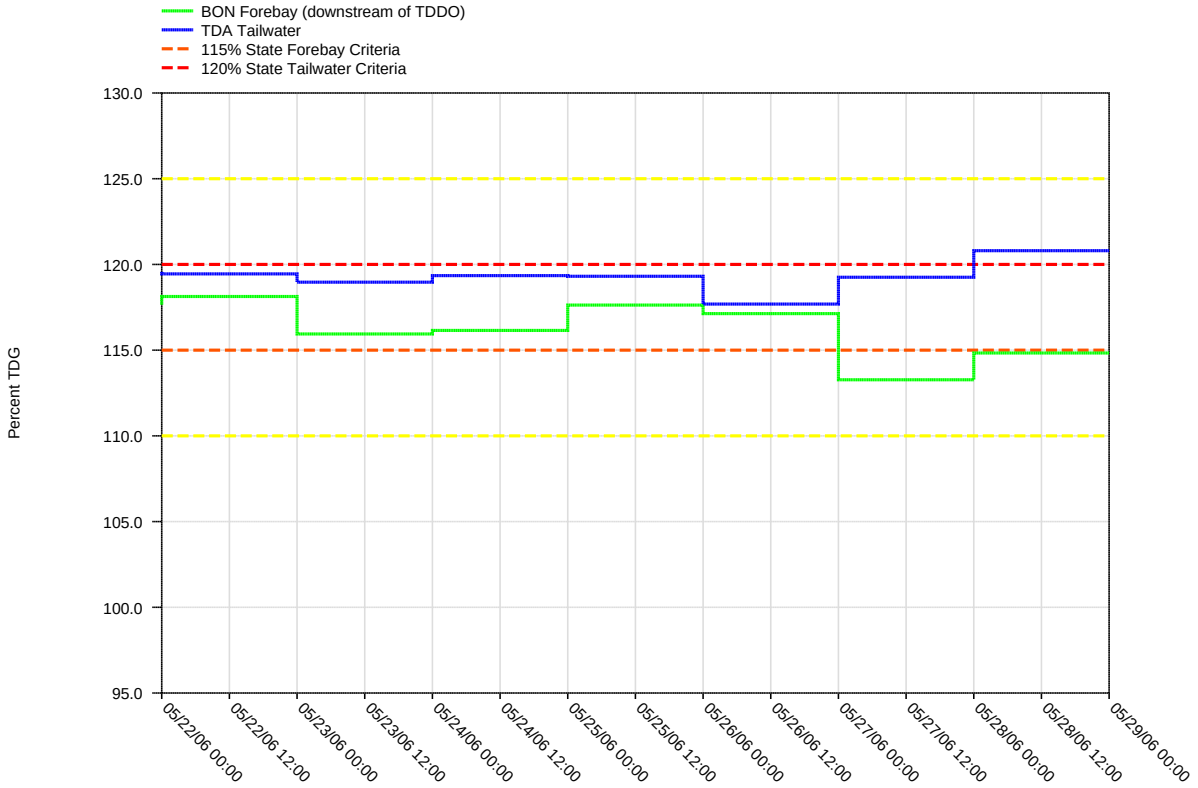


Figure 31.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

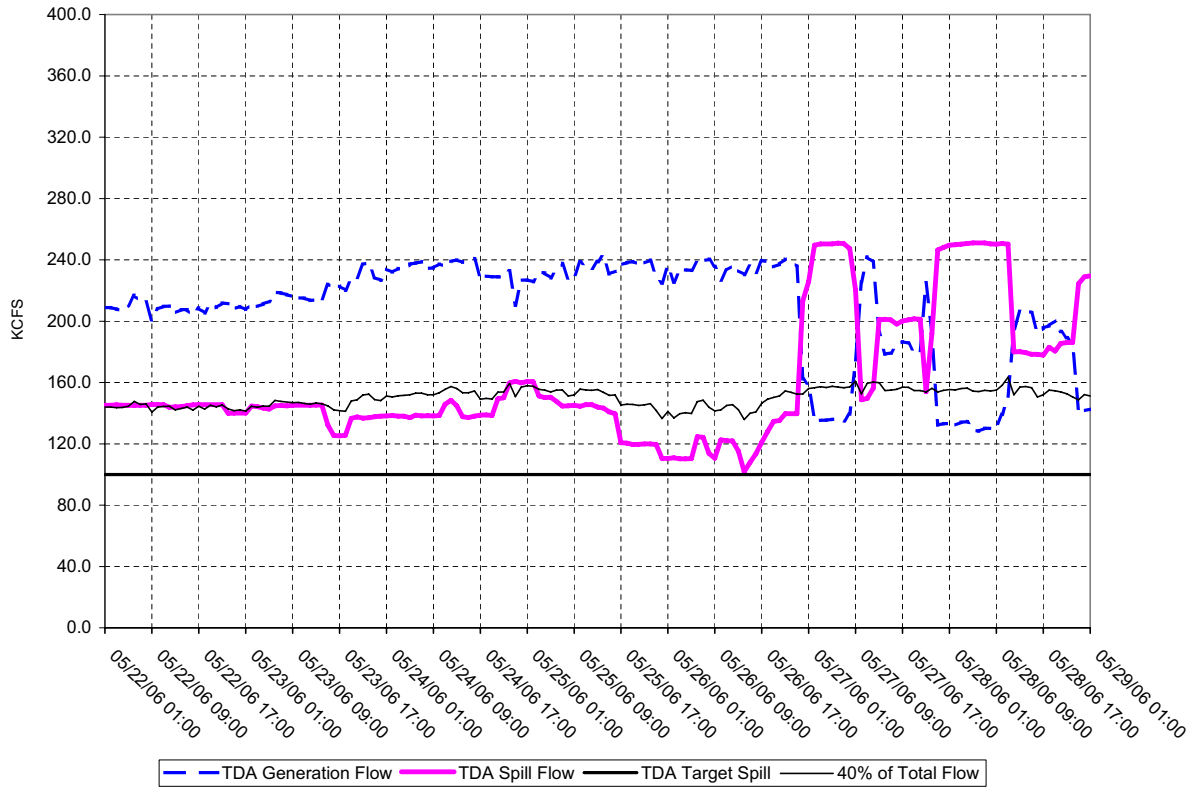
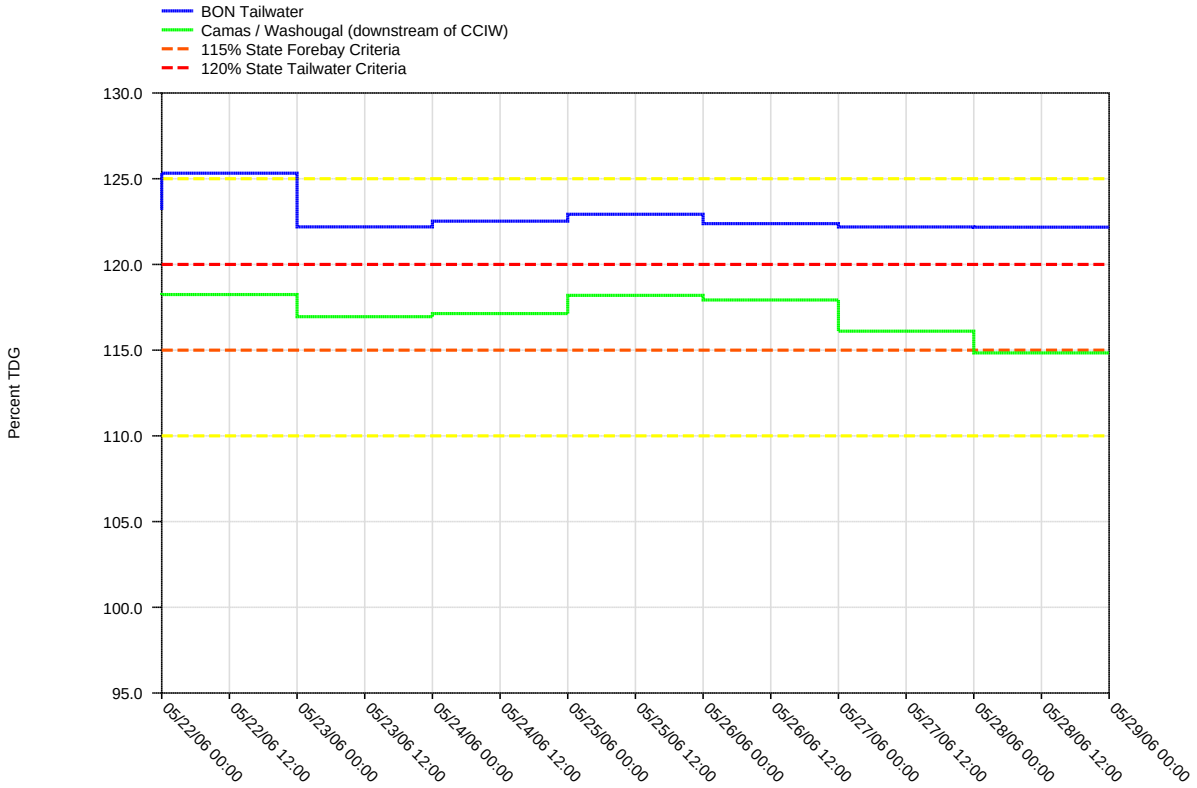
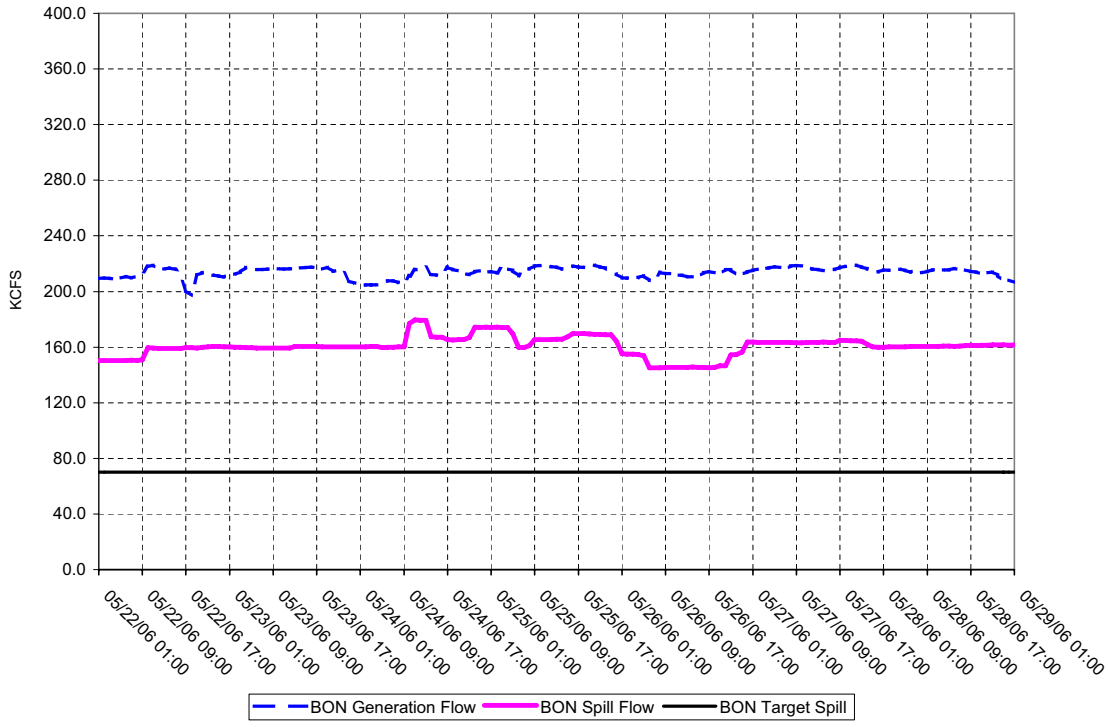


Figure 32.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow



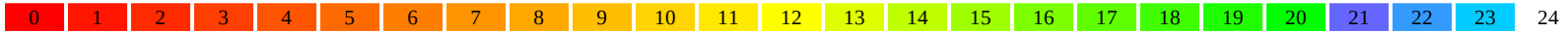
Planned Spill in FPIP is 100 kcfs

Table 1.
Average percent TDG for 12 highest hours - May 2006

Date	Monitoring Stations (full list)																	
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	WRNO	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	120	115
05/01/2006	106.0	123.8	112.0	117.6	114.2	118.4	113.3	120.6	111.6	119.8	112.3	116.6	112.5	116.3	111.5	122.5	114.3	112.0
05/02/2006	105.4	121.6	115.0	117.3	115.2	117.7	113.4	119.9	112.4	120.3	109.5	121.2	116.3	120.4	114.3	122.9	117.6	116.3
05/03/2006	106.2	119.6	117.4	118.5	117.2	118.4	114.8	118.9	111.7	120.3	111.3	120.6	116.9	119.9	119.3	122.6	119.9	118.1
05/04/2006	106.7	119.4	116.9	118.1	116.8	117.4	115.7	117.2	113.9	119.8	113.3	119.7	115.1	118.6	119.1	124.1	119.7	118.6
05/05/2006	107.0	118.0	117.4	118.1	117.6	117.5	116.3	117.2	115.0	115.6	116.3	119.1	115.1	118.5	117.8	120.9	117.8	117.9
05/06/2006	107.2	117.4	116.7	117.9	116.7	118.2	115.9	117.0	114.1	118.4	114.7	118.6	113.3	117.1	114.7	119.6	115.0	114.8
05/07/2006	106.3	117.4	112.9	114.7	115.4	118.2	114.5	118.3	110.4	119.7	112.7	118.8	111.7	116.8	112.1	120.2	113.0	112.3
05/08/2006	104.8	117.6	109.9	113.7	113.0	117.0	112.4	119.5	108.2	117.3	109.8	118.9	110.4	115.6	111.4	120.9	112.8	111.4
05/09/2006	104.2	115.8	110.1	115.1	110.9	115.6	111.5	118.9	110.1	114.8	106.9	118.8	112.9	117.8	113.6	122.2	114.2	113.5
05/10/2006	105.5	113.6	111.3	116.5	114.5	121.5	112.9	119.6	111.8	119.1	108.2	119.3	112.0	117.5	116.0	120.5	115.7	114.6
05/11/2006	106.8	110.9	112.4	115.3	117.0	121.7	115.4	118.1	113.6	119.6	109.7	119.1	113.2	117.2	116.3	120.0	116.3	115.7
05/12/2006	106.2	110.4	111.3	114.4	116.6	121.3	116.0	116.7	112.8	119.1	110.3	120.1	112.7	117.4	112.5	120.1	113.9	113.4
05/13/2006	104.7	110.3	108.6	113.7	114.2	120.4	115.3	116.9	111.6	118.9	111.4	120.1	114.7	118.9	114.2	121.4	114.7	113.5
05/14/2006	104.9	113.7	108.4	112.0	114.4	119.8	115.7	119.3	113.1	117.1	112.0	118.6	115.5	118.7	116.7	119.9	117.0	116.6
05/15/2006	106.2	119.1	109.2	112.3	115.5	118.8	116.6	118.6	115.9	115.1	113.2	118.7	116.7	119.3	117.0	120.8	116.9	115.4
05/16/2006	106.6	122.3	111.3	116.6	115.3	118.8	116.2	118.0	116.6	115.4	114.3	118.8	114.8	117.9	117.0	119.5	116.8	117.0
05/17/2006	106.6	125.1	116.2	118.1	118.9	119.7	116.6	120.8	117.2	115.9	117.1	120.2	116.8	118.8	115.2	120.6	115.4	116.0
05/18/2006	106.5	129.7	119.5	122.1	120.4	121.4	118.5	123.0	117.0	120.5	117.5	120.2	117.2	119.7	115.4	122.8	117.5	116.0
05/19/2006	107.1	131.0	120.8	123.1	123.6	122.5	119.0	123.5	116.2	121.7	116.7	120.5	116.3	119.4	116.6	124.9	118.9	117.1
05/20/2006	107.0	131.6	121.4	125.7	123.8	125.0	119.3	124.5	115.0	122.3	115.0	120.8	116.0	118.9	116.4	125.2	119.1	118.3
05/21/2006	108.1	132.9	124.7	126.9	128.7	126.4	122.9	125.4	116.3	121.6	115.4	120.2	116.4	119.6	117.7	123.2	119.7	118.2
05/22/2006	108.7	130.9	125.4	124.3	129.7	124.0	124.5	124.5	117.3	121.4	115.8	121.2	115.8	119.4	118.1	125.3	120.1	118.2
05/23/2006	106.8	130.4	122.6	123.4	124.1	122.4	121.7	124.1	114.9	120.5	115.3	121.1	116.2	119.0	115.9	122.2	119.0	117.0
05/24/2006	107.1	129.6	122.1	122.9	124.3	122.3	120.4	123.9	113.9	120.2	115.4	122.6	116.8	119.3	116.2	122.5	119.4	117.1
05/25/2006	107.7	126.5	122.1	121.2	124.0	121.1	121.1	123.5	113.1	120.0	114.5	121.0	116.2	119.3	117.6	122.9	120.0	118.2
05/26/2006	107.4	125.8	121.5	119.4	122.4	119.7	120.2	120.7	112.8	121.1	114.2	120.8	114.5	117.7	117.1	122.4	119.2	117.9
05/27/2006	106.3	123.2	118.4	121.5	119.9	121.2	117.7	120.1	110.4	121.8	112.9	123.3	115.2	119.3	113.3	122.2	117.1	116.1
05/28/2006	105.0	122.7	116.8	123.0	121.5	119.1	116.8	117.9	112.0	121.6	110.5	122.1	115.6	120.8	114.8	122.2	117.4	114.8

Generated: Wed May 31 09:25:00 2006

Number of hours of data reported in a given day



Big, bold, red text denotes exceedances.
--- indicates No Data
Dates run from hour 1 to 24 (not 0 to 23).
The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st.
At all other times, the gas cap is 110%.

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
WRNO	Bonneville Tailwater (Warrendale)
CWMW	Camas / Washougal

Effective April, 2006

FISH PASSAGE IMPLEMENTATION PLAN REPORT
June 2006

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

In accordance with the Court's instructions in the December 29, 2005 Opinion and Order, the U.S. Army Corps of Engineers (Corps) is providing the monthly report as described in the Fish Passage Implementation Plan (FPIP) submitted to the Court on April 3, 2006. The Corps' lower Columbia and Snake River project and fish passage operations for the month of June 2006 identified in the Order are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant 12-hour average total dissolved gas (TDG) for the tailwater at each project and for the next project's forebay downstream.

This report also provides information on issues presented and unanticipated or emergency situations that arose during implementation of the spill program for the month of June 2006.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per week in June displaying the progress of the spill program as follows:

(A). Daily Average of the High 12 Hourly % Total Dissolved Gas (TDG) Values - described in the upper graph.
(B). Hourly Spill and Generation Flows – described in the lower graph.

The weekly graphs begin on May 29 and end on July 3 for the following Lower Snake and Lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville Dams.

Each figure represents one week of operation for a project. The graphs start on Monday 0100 hours through Monday 0100 hours for the following dates:

May 29 – June 5	Figures 1 - 8
June 5 – June 12	Figures 9 - 16
June 12 – June 19	Figures 17 - 24
June 19 – June 26	Figures 25 – 32
June 26 – July 3	Figures 33 – 40

A. Upper Graph: Shows the resultant daily average percent TDG for the 12 highest hours as the result of spill from the dam. The objective is to operate each project up to the TDG limits without exceeding those limits if possible.

- The blue line on the graph represents the TDG in the tailrace of the dam. 120% TDG is the upper operating limit.
- The green line represents the TDG in the forebay of the next dam downstream. 115% is the upper operating limit.

B. Lower Graph: Represents the flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The heavy red line represents the hourly flow through the spillway in kcfs.
- The thin black line represents the project spill levels shown in the spring and summer spill tables in the 2006 FPIP (pages 1 – 2).
- Each graph includes a heavy black line that represents the target spill. This is the hourly spill level as defined in the 2006 FPIP. This maximum spill level is subject to the following conditions:
    - Spill percentage or discharge specified in the FPIP;
    - Spill caps as set daily for TDG management;
    - Test spill levels for fish passage research; and,
    - Minimum generation for power system needs.

  The hourly target spill may vary as a function of quantity of river flow and generating units available at a project.

II. A monthly table (Table 1) is included at the end of the report that shows the overall daily results of the average percent TDG for the 12 highest hours for all projects. The numbers in red show exceedances of the TDG gas cap - 115% (forebay) or 120% (tailwater) for each project.

Operations:

During this reporting period, all projects shifted from spring to summer fish passage operations. All of the projects on the Snake River (Lower Granite, Little Goose, Lower Monumental, and Ice Harbor) transitioned from spring to summer spill at 0001 hrs on June 21. For the Columbia River projects, John Day, The Dalles, and Bonneville transitioned from spring to summer spill at 0001 hrs on July 1. McNary Dam began summer spill at 0600 hours on June 20 to begin a spill test. Transported juvenile fish were barged every other day in June at Lower Granite, Little Goose, and Lower Monumental Dams.

There was high inflow in June across the Columbia Basin. This inflow was the result of warm weather and rapid snowmelt which resulted in high flows in the unregulated (natural) tributaries. Involuntary spill occurred frequently as high flows exceeded powerhouse capacity. As flows remained high through the month, so did involuntary spill levels. As a result there were many hours when the spill volume was greater than the

target spill. In many of these instances of involuntary spill, the resultant TDG exceeded the 115%/120% limits. Brief periods when the spill was below the level described in the FPIP can be seen on the graphs where the heavy red line dips below the heavy black line. When the operation varied from the target spill or other anomalies occurred, explanations are included in the table at the end of this section (page 5).

For the first half of the month of June at Lower Granite Dam, spill occurred in excess of the 20 kcfs target spill because of high inflows and limited power load requirements. Beginning June 16, the project spilled 20 kcfs and remained at that level throughout the rest of the month. At Little Goose Dam the target spill was 30% of the total flow, except when limited to stay within the TDG limits. For most of the month of June, Lower Monumental Dam spill was limited to less than 40 kcfs, also to remain within TDG limits. On June 21, the project shifted to the summer spill level of 17 kcfs, or less if needed to stay within TDG limits. At Ice Harbor, McNary, and John Day dams, the spill described in the FPIP varied from daytime to nighttime, and is shown as the heavy black line on the graph. At The Dalles and Bonneville dams, there were periods when spill levels were reduced to stay within TDG limits. Spill at The Dalles Dam was lowered from 135 to 90 kcfs for this purpose, while Bonneville Dam spill was reduced from 102 to 65 kcfs.

The following describes significant operational adjustments made through the regional forum process:

1. John Day Dam spill operations as a result of units 1 – 4 being out of service were discussed with the TMT and the Fish Passage Operations and Maintenance Coordination Team (FPOM). In response to System Operational Request (SOR) # 2006-3 dated April 4, the Corps agreed to closely monitor fish passage and hydraulic conditions, then if needed, address any observed problems through operational changes to assure efficient passage of migrating fish. John Day shifted to 30% spill 24 hours per day on July 1. The Corps continued to monitor conditions at the project to ensure that safe and efficient fish passage is maintained.

2. Juvenile fish transportation operations at lower Snake River collector projects continued through June, with transport by barge occurring every other day, starting at Lower Granite Dam. Barging frequency went from daily to every other day starting May 30 at Lower Granite, Little Goose, and Lower Monumental Dams, due to lower numbers of fish collected. Transport operations were carried out concurrent with spill at the projects. These operations were in accordance with criteria in the Fish Passage Plan.

In addition, there were also minor operational adjustments made through the regional forum process:

1. An hourly variance of +/- 1% of percent of total flow for the 40% spill operations at The Dalles was discussed and agreed to at the May 17 Technical Management Team (TMT) meeting. This was done to better meet the 40% spill level operationally. Reservoir Control Center (RCC) issued instructions to The Dalles project to make these adjustments.

2. Final dates for the summer spill test at Lower Granite were coordinated with TMT members on May 31 and June 2. The FPIP specified dates of approximately June 20 – July 21, with regional coordination to determine final dates. The summer spill test began on June 8 and will end on July 17. The earlier dates were set to coincide with the juvenile fish migration and improve fish availability. TMT members present agreed to these changes. The spill discharge level for the two alternating test conditions is the same as stated in the FPIP.

3. McNary spring spill operations for research began on April 26 at 0600 hours and continued until June 9 at 0559 hours. The FPIP estimated April 20 through June 3 for the spring test. Spill treatments during the spring consisted of two days of 12-hour gas cap spill, from 1800 to 0600 hours, and two days of 24-hour 40 percent spill, with the two treatments alternating in a randomized block design throughout the study period. From June 9 to June 20, between the spring and summer tests, McNary spilled to the TDG cap for 12 hours each night (1800 to 0600 hours). McNary summer spill operations for research began on June 20 at 0600 hours and will continue until 22 July at 0559 hours. These are consistent with the dates estimated in the FPIP for the summer test. Spill treatments during the summer consist of two days of 24-hour 40 percent spill and two days of 24-hour 60 percent spill, again with the two treatments alternating in a randomized block design. Specific dates for the summer study were coordinated through the Studies Review Work Group (SRWG).

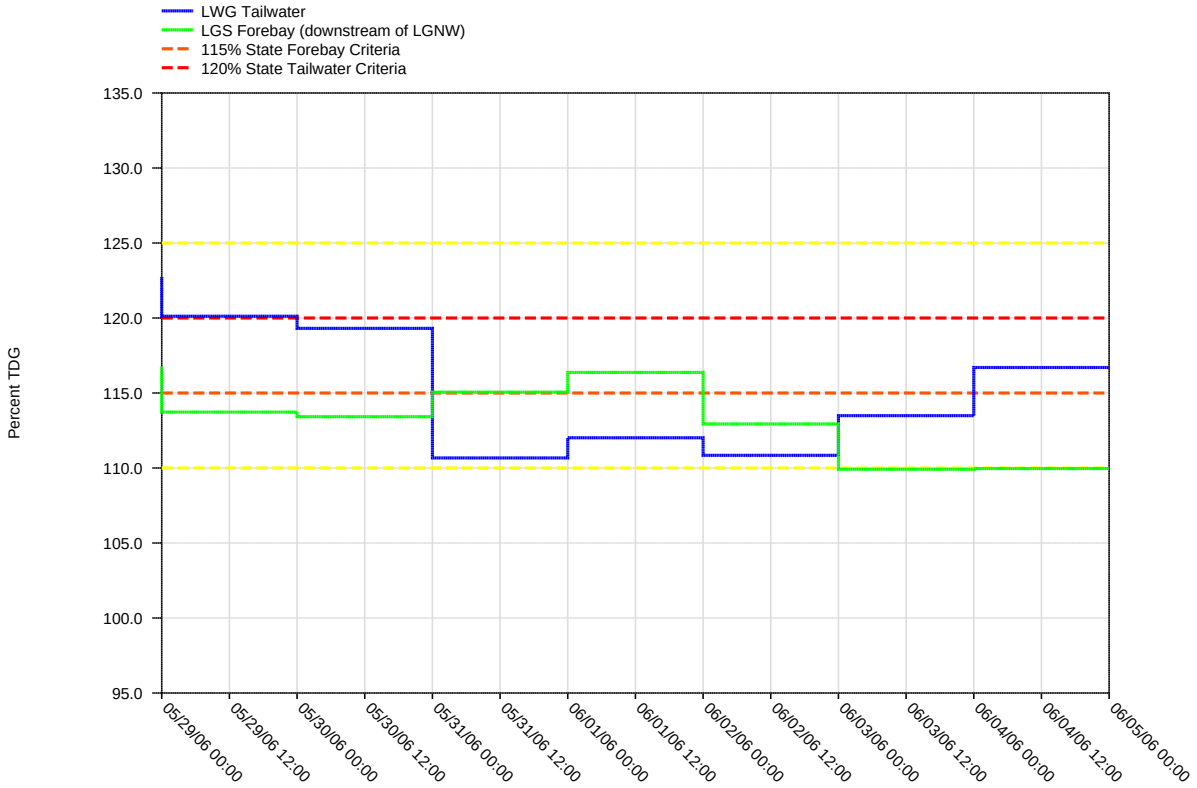
4. In an effort to keep TDG levels in the Bonneville tailrace below the 120% TDG limit, spill was raised slightly above the 100 kcfs flow specified in the FPIP. This was done as a result of information that indicated that a slight increase in spill at Bonneville may result in slightly less TDG as measured at the Cascades Island (CCIW) Fixed Monitoring Site (FMS). The reduction in TDG at higher spill levels was believed to be a result of the specific spill patterns utilized when spilling at 100 kcfs versus 102 kcfs. The only other alternative was to reduce spill to approximately 75 – 80 kcfs to keep TDG levels at CCIW below the 120% criteria. Setting the spill cap between 80 and 95 kcfs was not desired due to the spill pattern causing TDG levels at CCIW to significantly exceed the 120% criteria. Therefore, Bonneville Dam spilled to approximately 102 kcfs from 1400 hrs on June 20 until 1000 hrs on June 25. The operation was ceased when TDG levels at the Camas-Washougal FMS began to exceed the 115% criteria and this FMS became the primary determinant of the spill cap for Bonneville Dam.

Variances from target spill and other anomalies in the graphs
June 2006 Spill Season

Project	Parameter	Date	Time	Reason
McNary	Spill	6/1/06	2000 – 2100	Project reduced spill discharge to avoid dropping below the bottom forebay elevation limit.
Lower Monumental	Spill	5/29/06 5/31/06 6/2/06 6/4/06 6/6/06 6/8/06 6/12/06 6/14/06 6/16/06 6/18/06 6/22/06 6/24/06 6/26/06 6/30/06 7/1/06 7/2/06	1700 – 1900 1800 – 1900 1500 1800 – 2100 2000 – 2300 1800 – 1900 1800 – 1900 1900 1800 – 1900 1800 – 1900 1800 – 2000 1800 1800 0000 – 0400 0600 1800 – 1900	Project reduced spill to allow safe movement of fish barges in the loading area.
Lower Monumental	Spill	6/16/06	1200 – 1300	Spill was reduced to allow NOAA Fisheries researchers to repair fish antennas.
Lower Granite	Spill	6/22/06	0900	Spill was stopped for 30 minutes to remove a large tree from the spillway.
Lower Granite	Spill	6/21/06	0001 – 0700	Planned spill was 18 kcfs; however, the project spilled 20 kcfs for 32 hours. Researchers needed to finish a test block before switching to a new fish test regime.
The Dalles	Spill	6/22/06 6/22/06 6/24/06 6/28/06	0700 – 1000 0300 – 0700 0700 – 0900 0800 – 0900	Project spilled 38 – 38.9% instead of 40%. The Dalles was carrying reserves for and on control of hydrosystem power generation to ensure grid stability.
McNary	Spill	6/27/06	1300 – 1400	Weir gate repairs required spillbays 1-3 to be shut down.
McNary	Spill	6/28/06	1400	Fish ladder repair required 0 kcfs spill through spillbays 1 - 3.

Figure 1.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

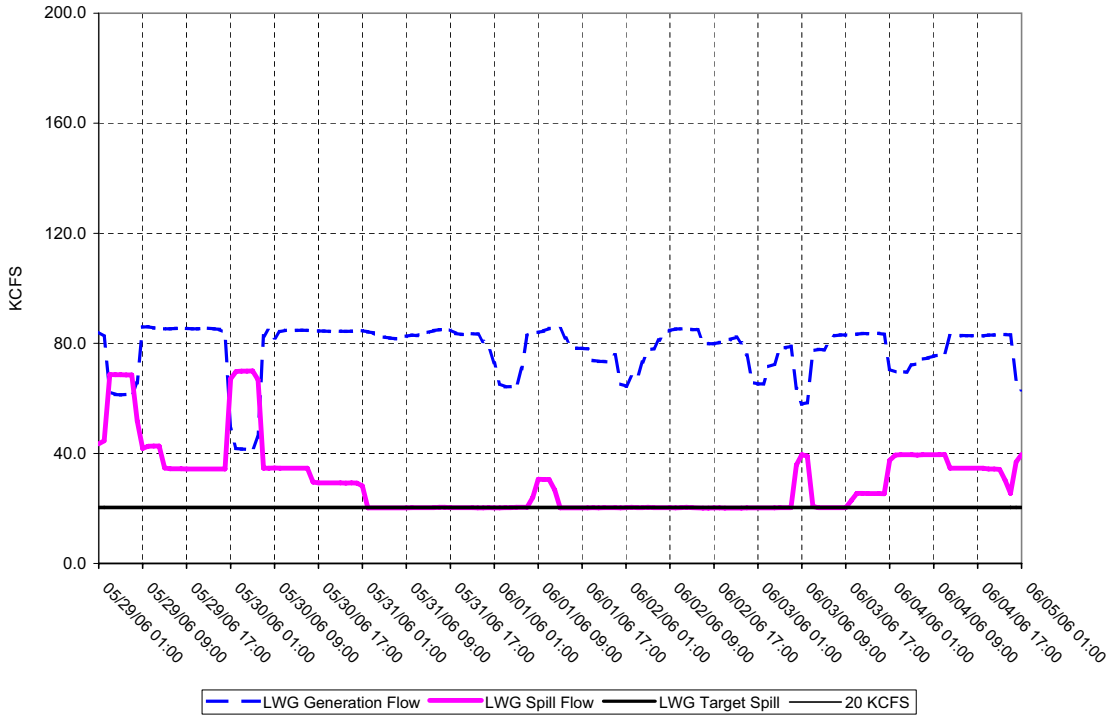
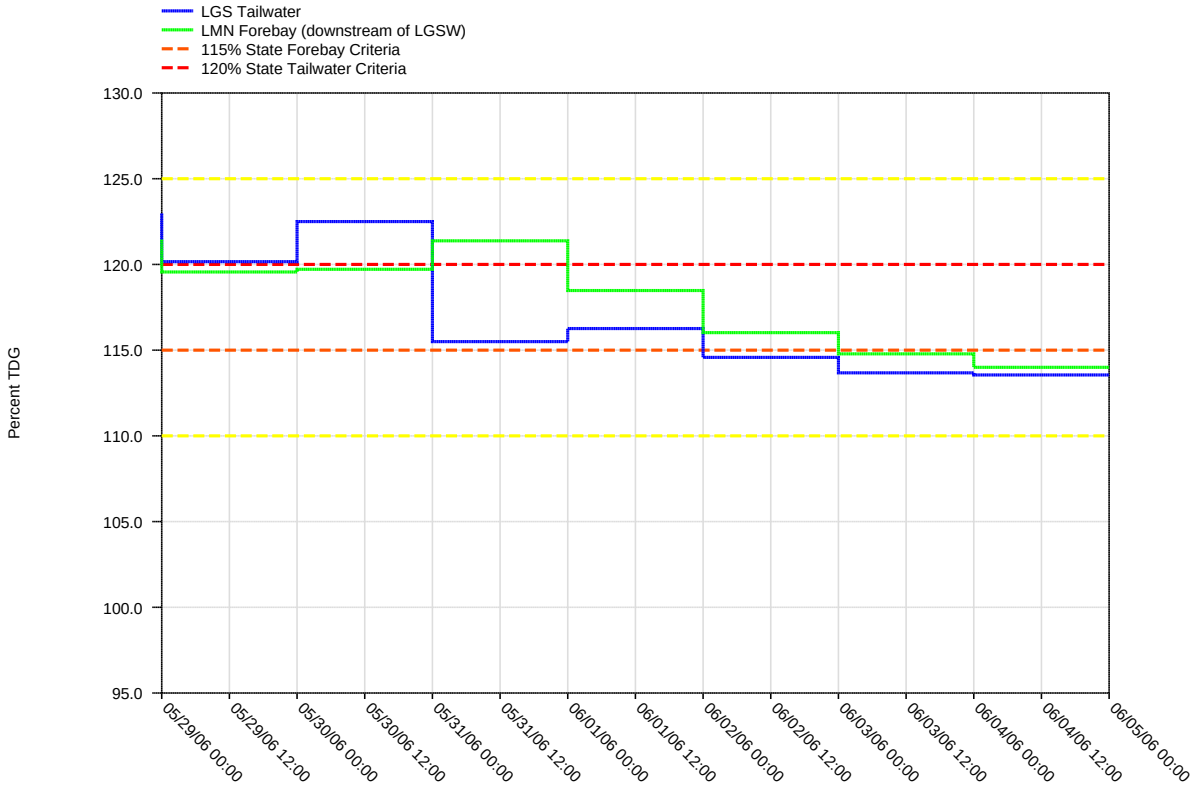


Figure 2.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

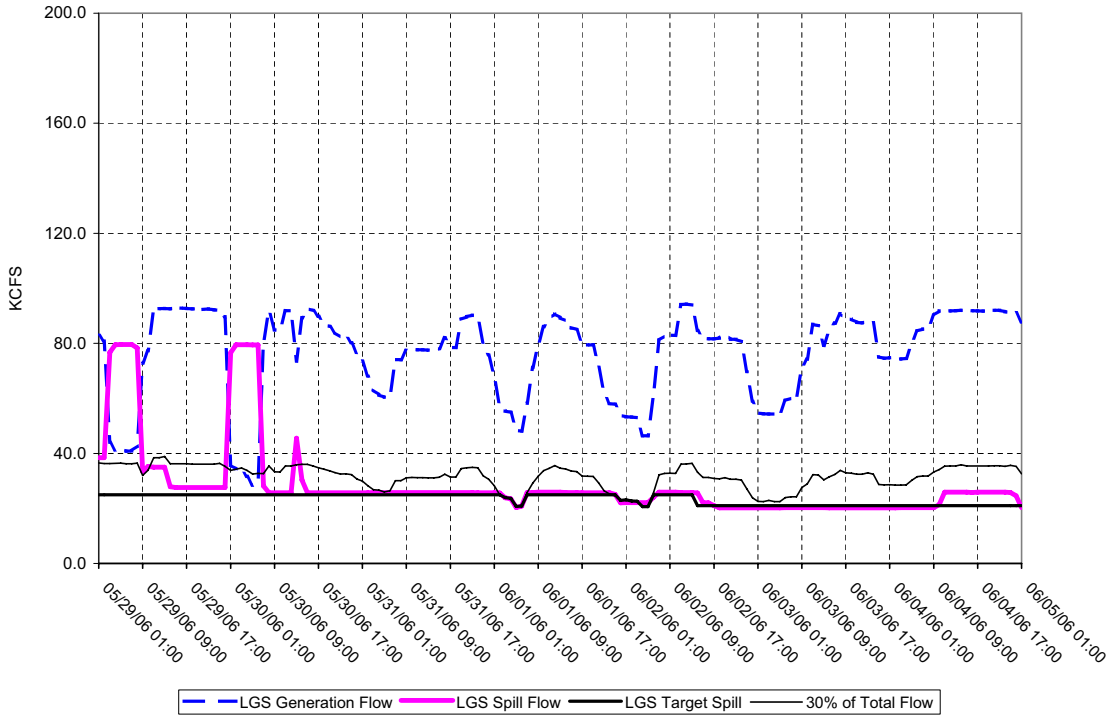
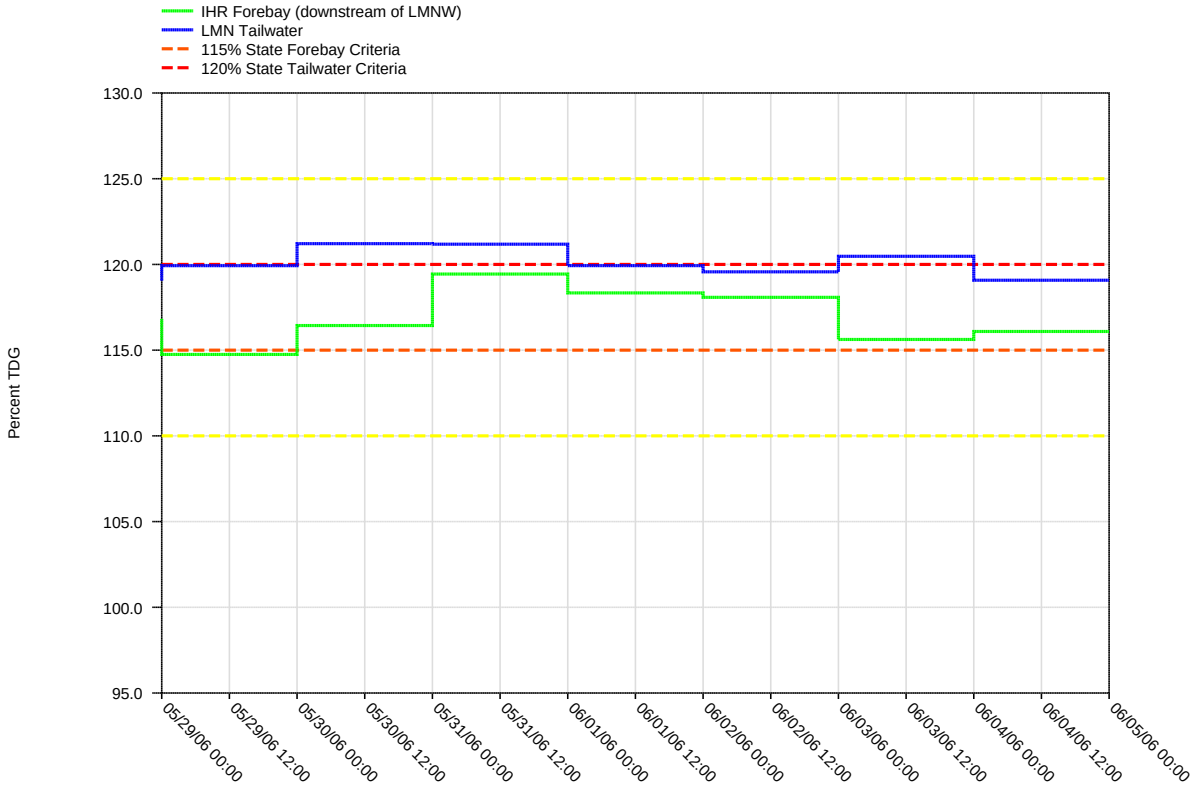


Figure 3.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

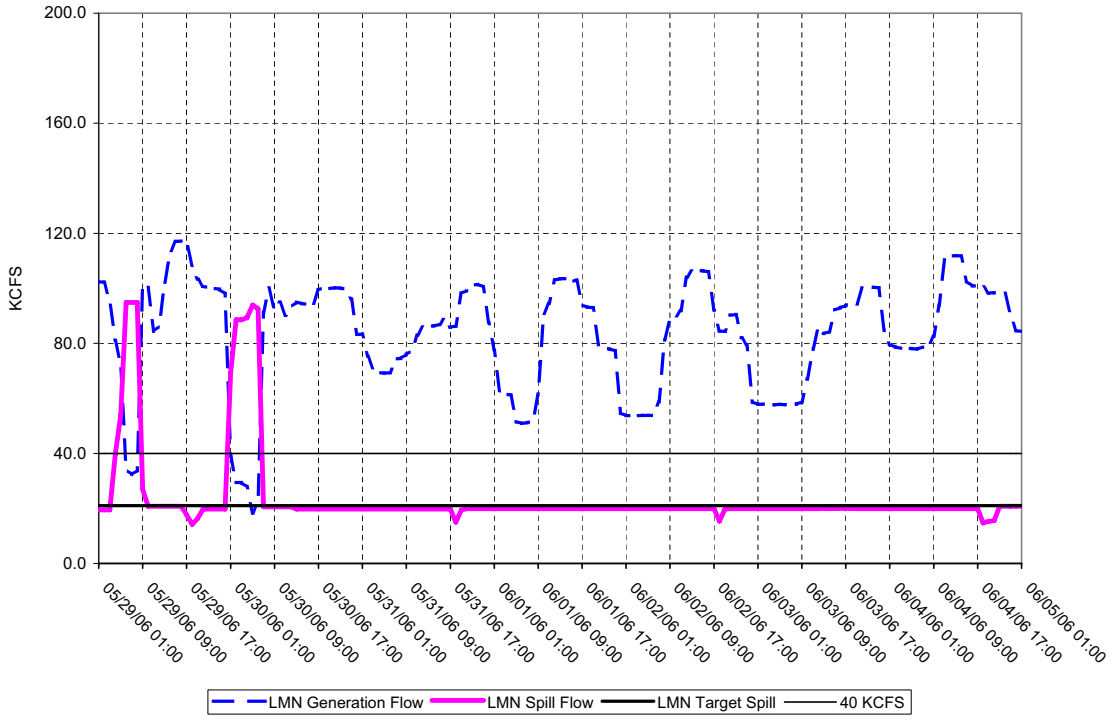
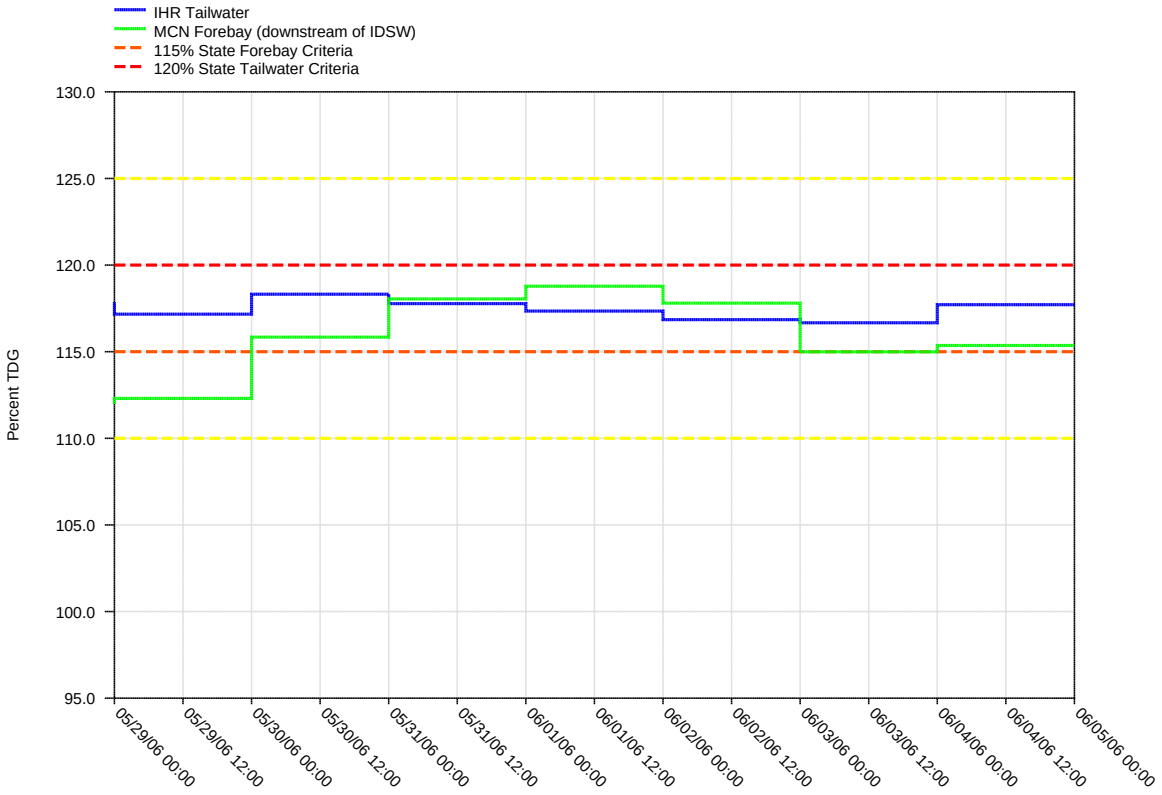


Figure 4.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

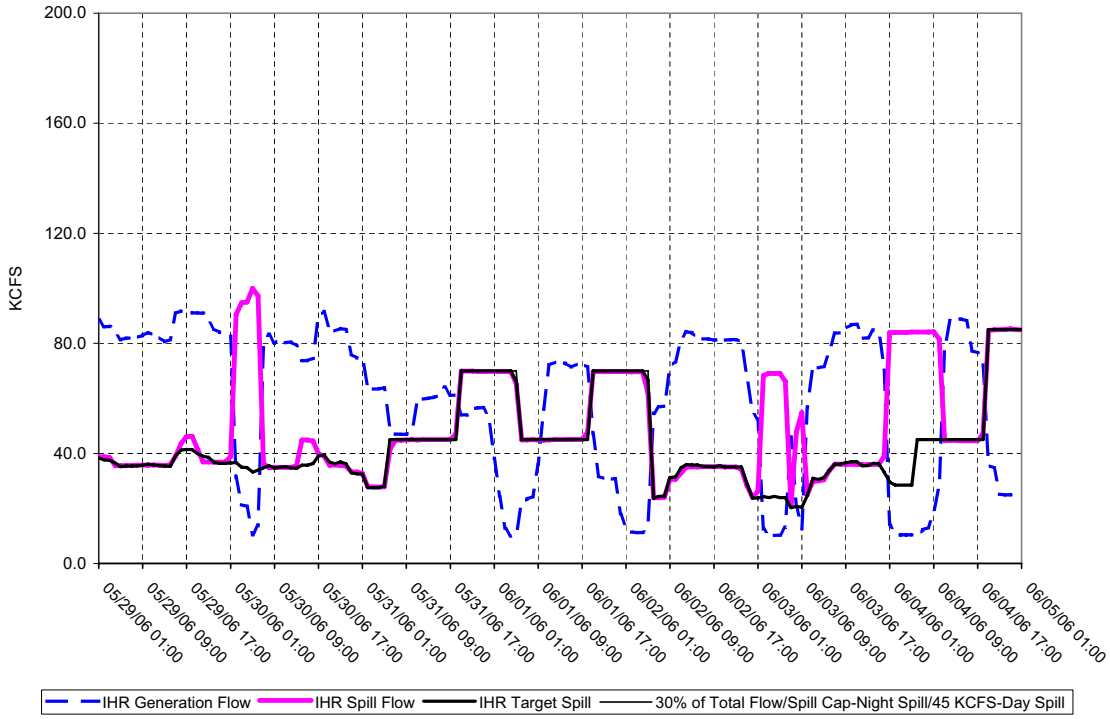
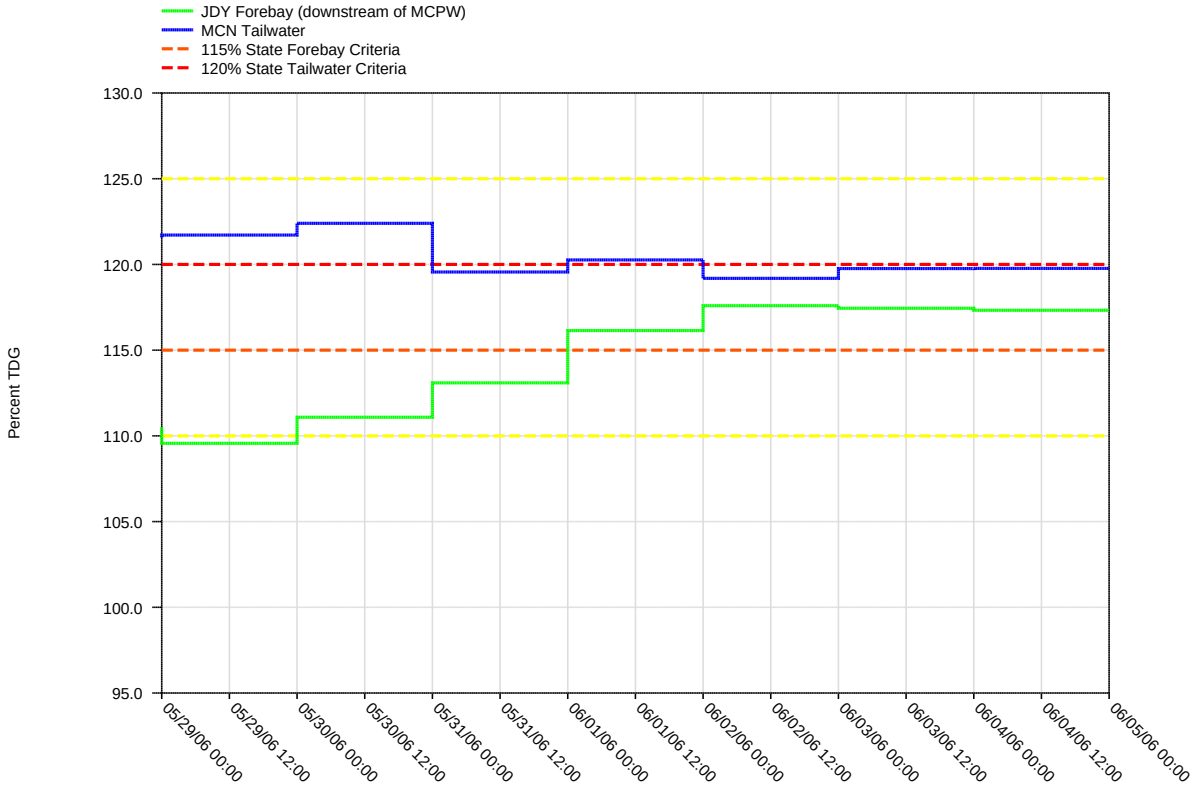


Figure 5.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

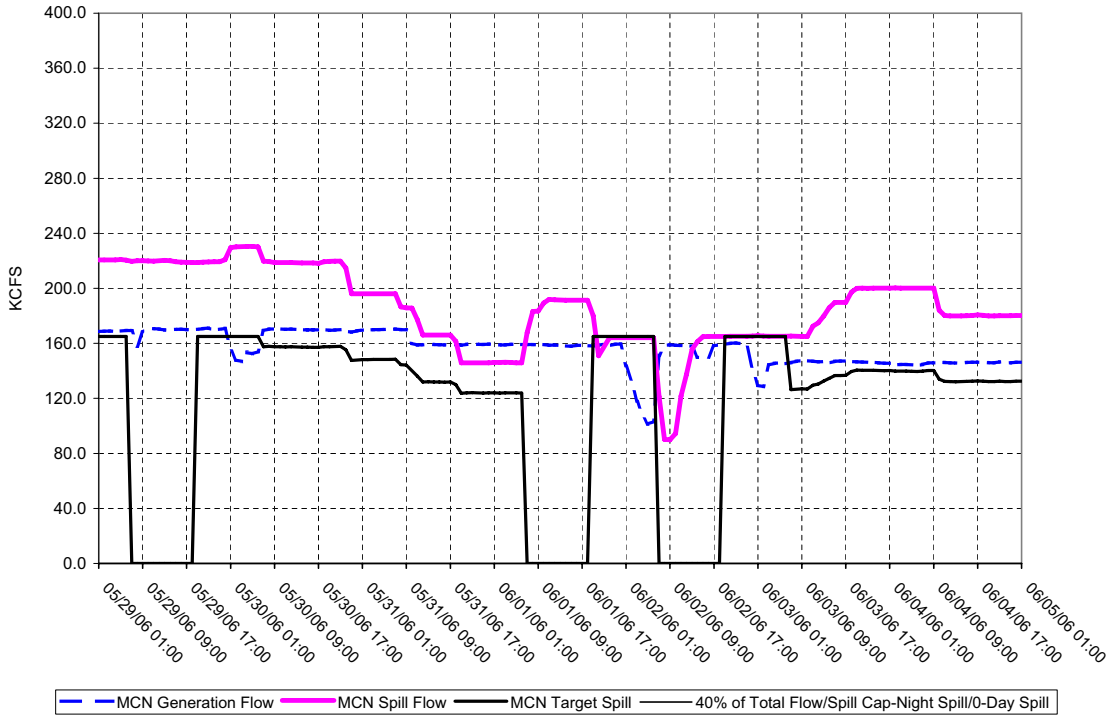
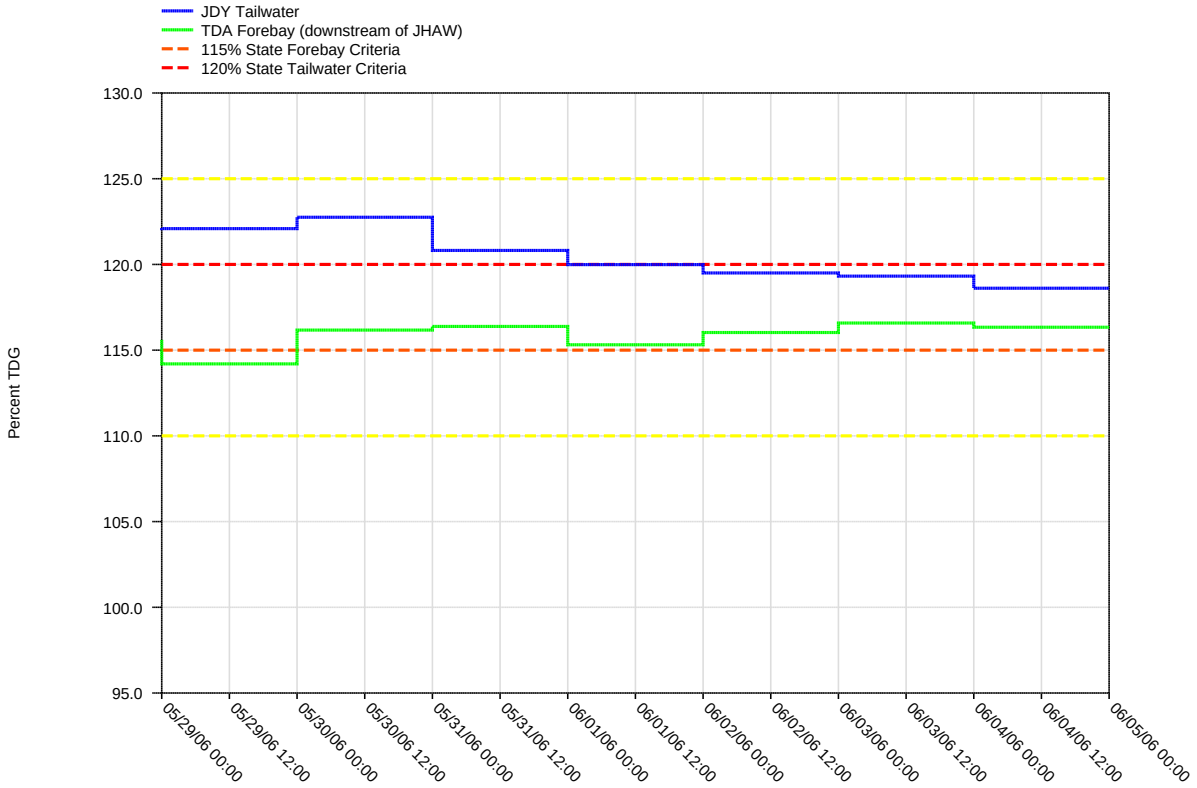


Figure 6.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

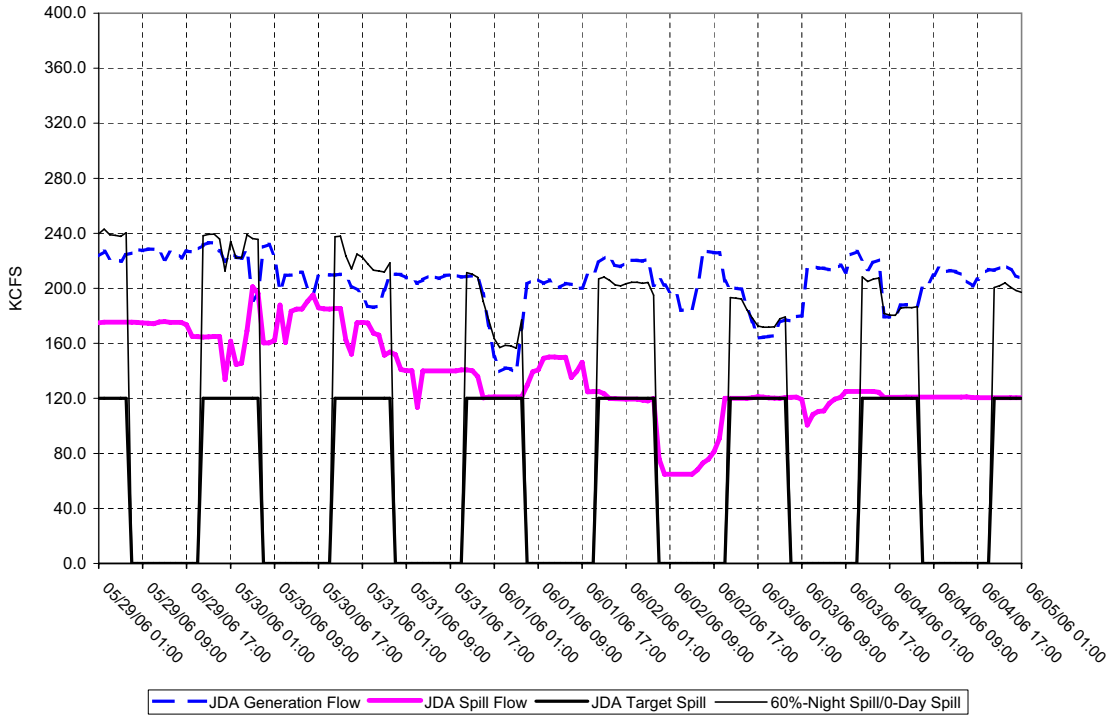
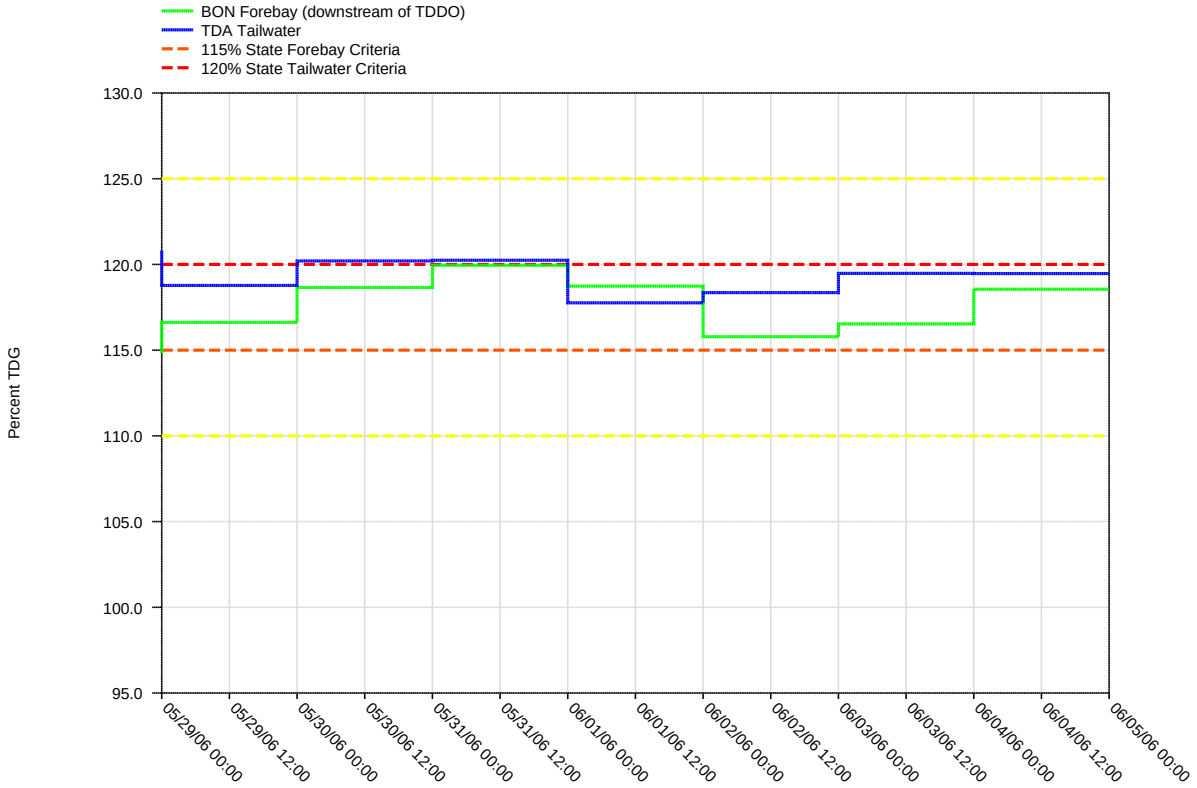


Figure 7.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

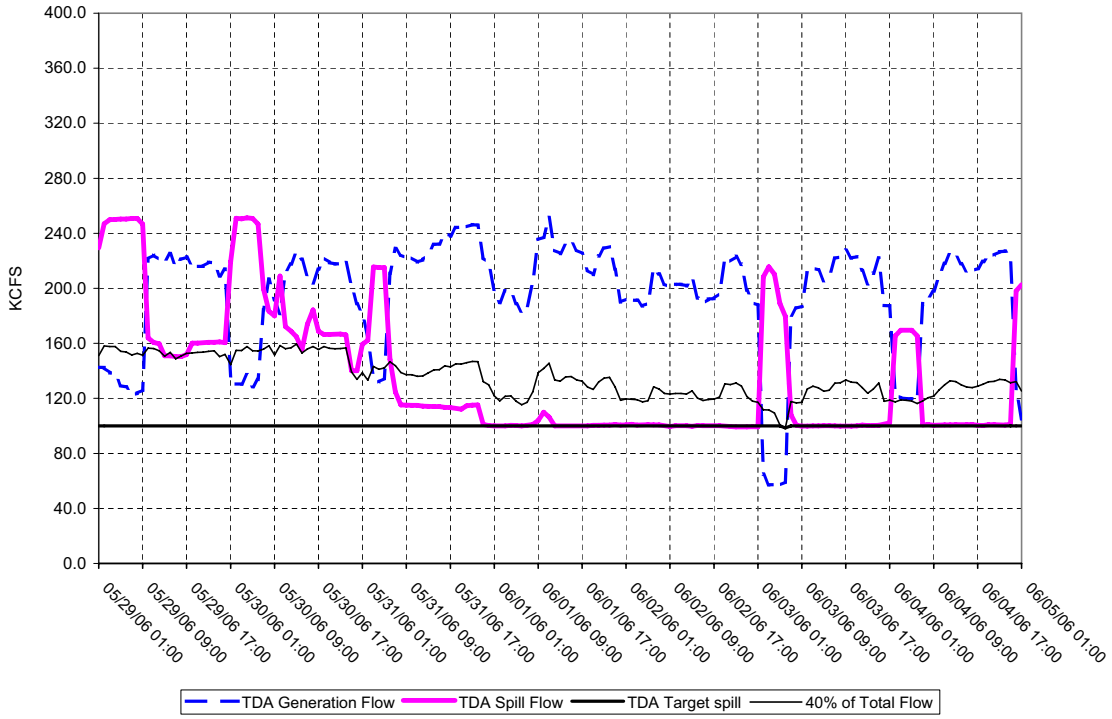
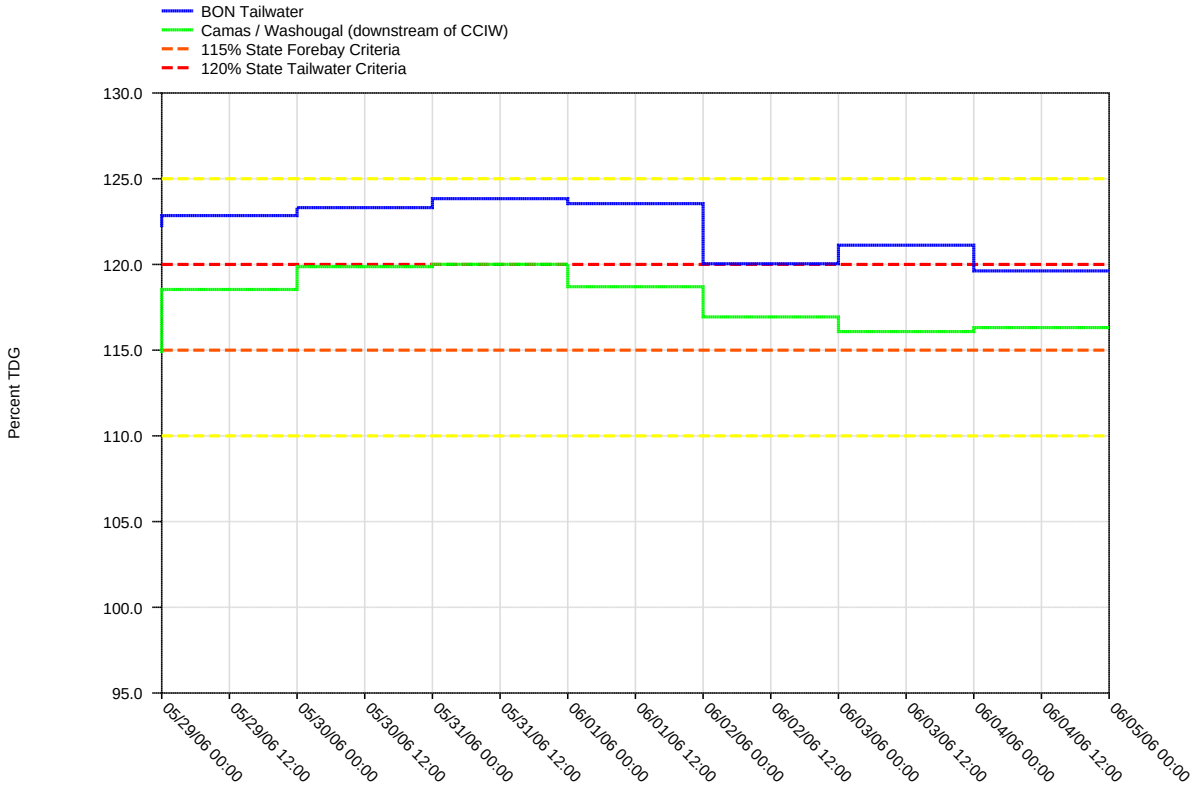


Figure 8.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

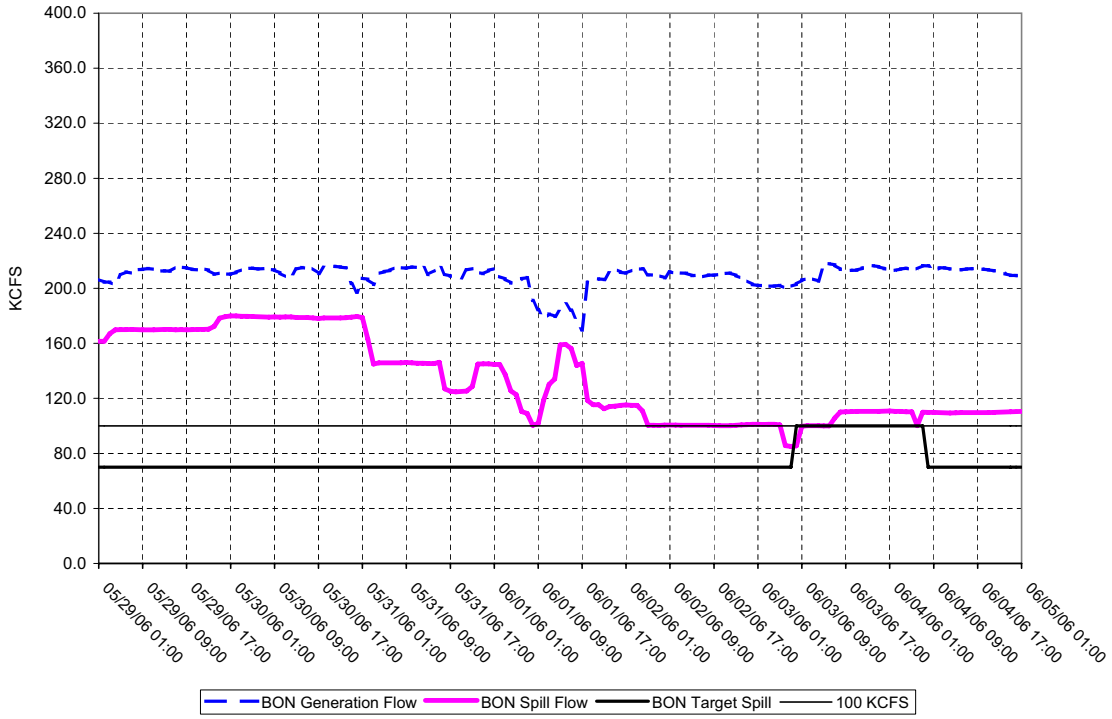
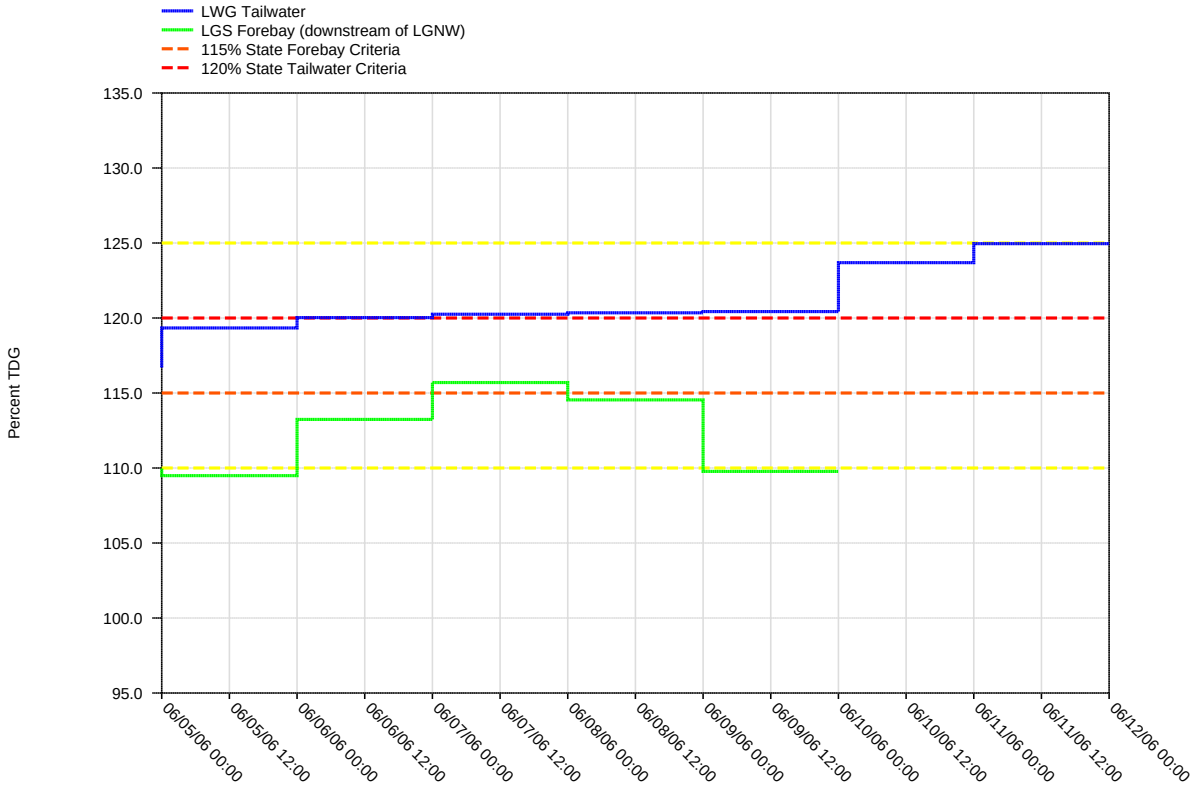


Figure 9.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

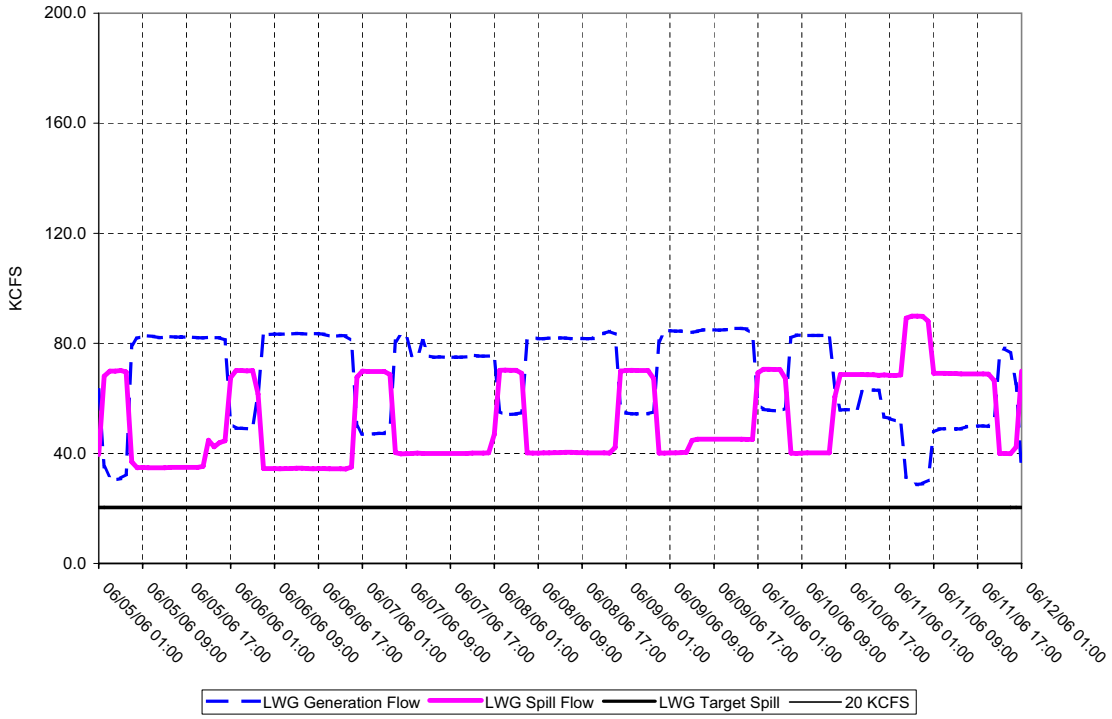
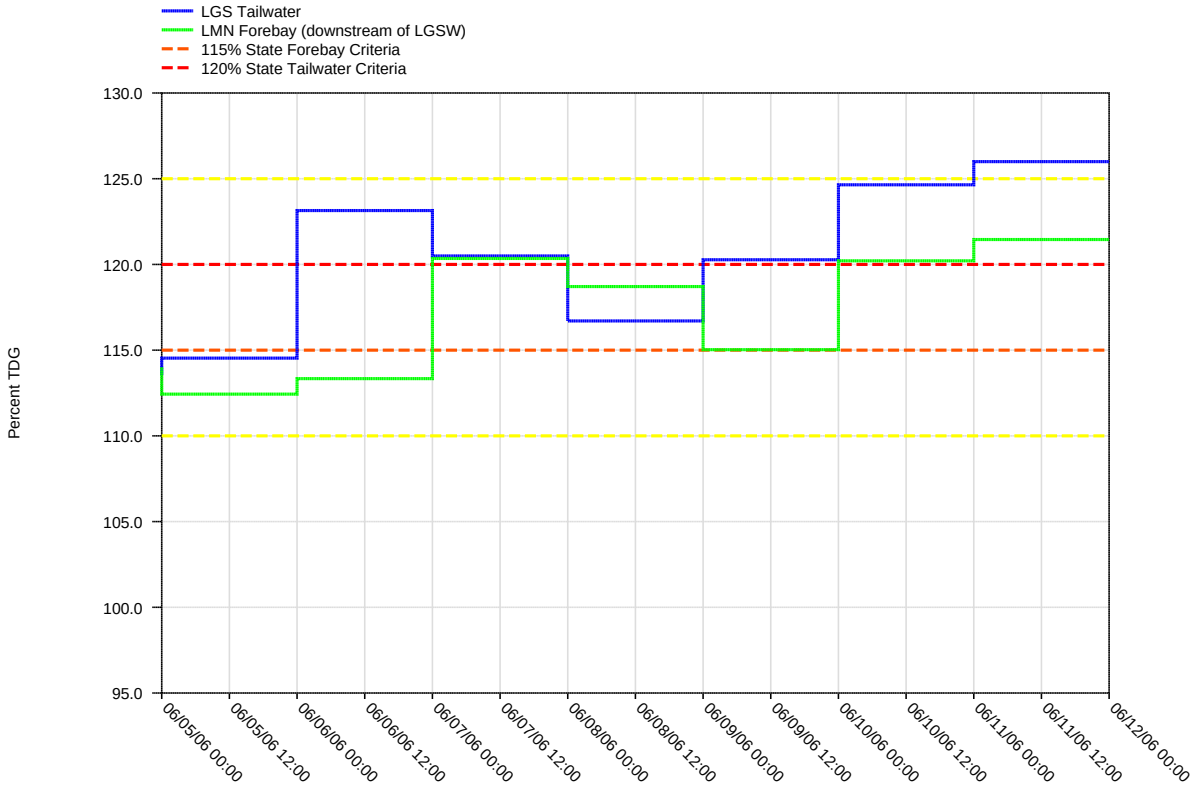


Figure 10.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

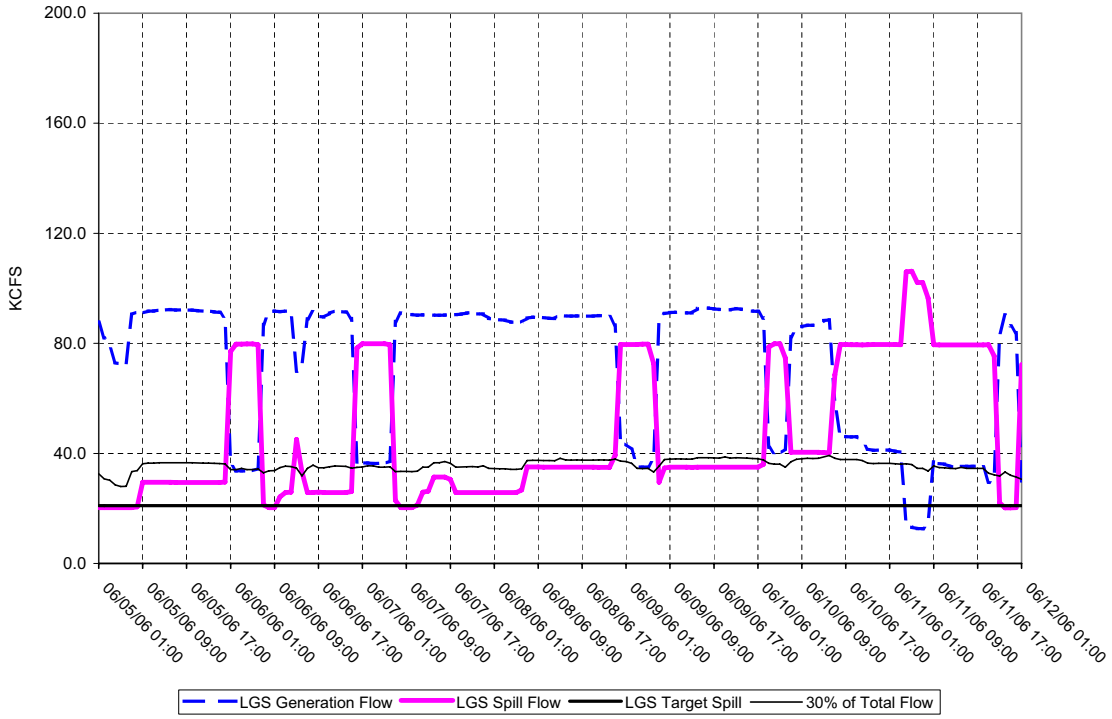
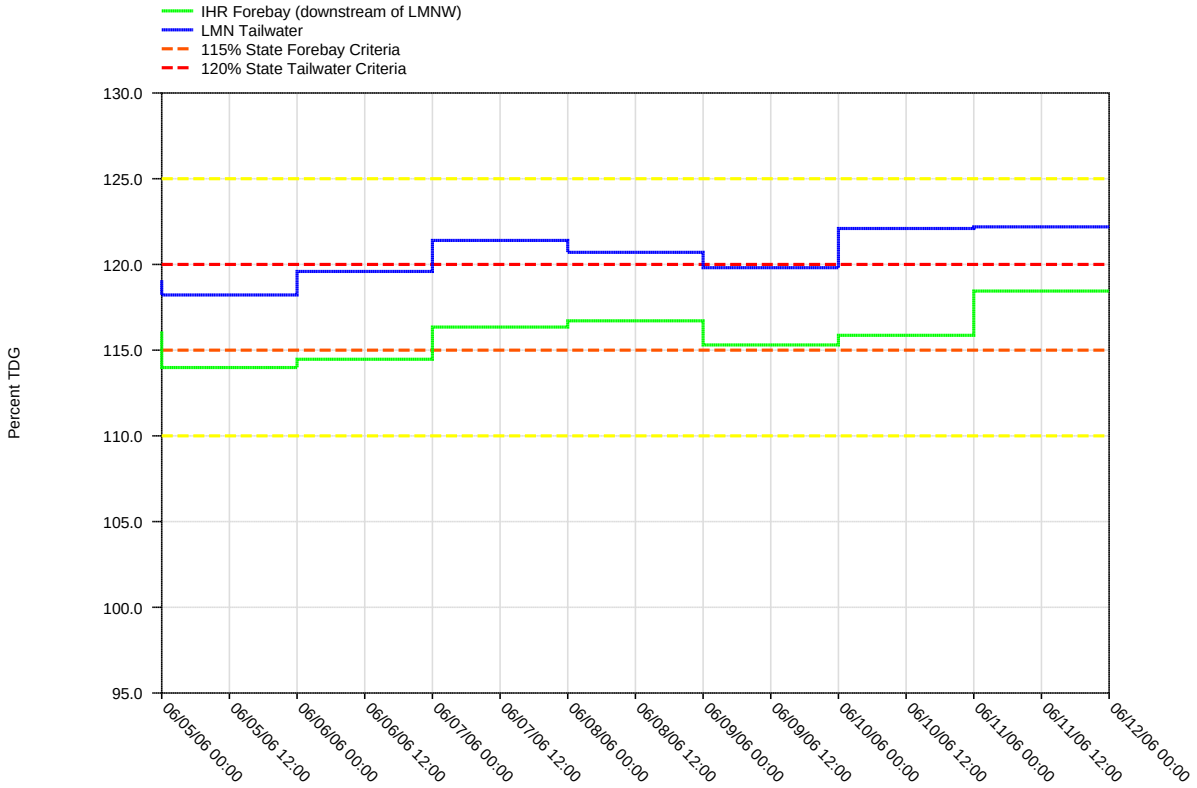


Figure 11.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

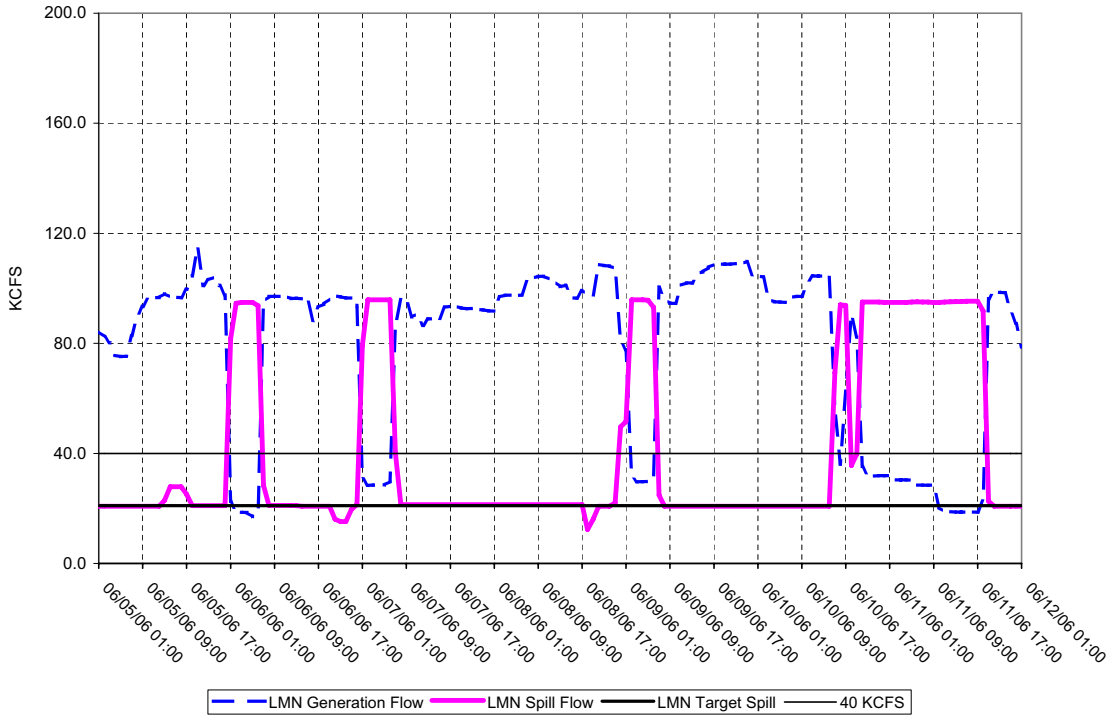
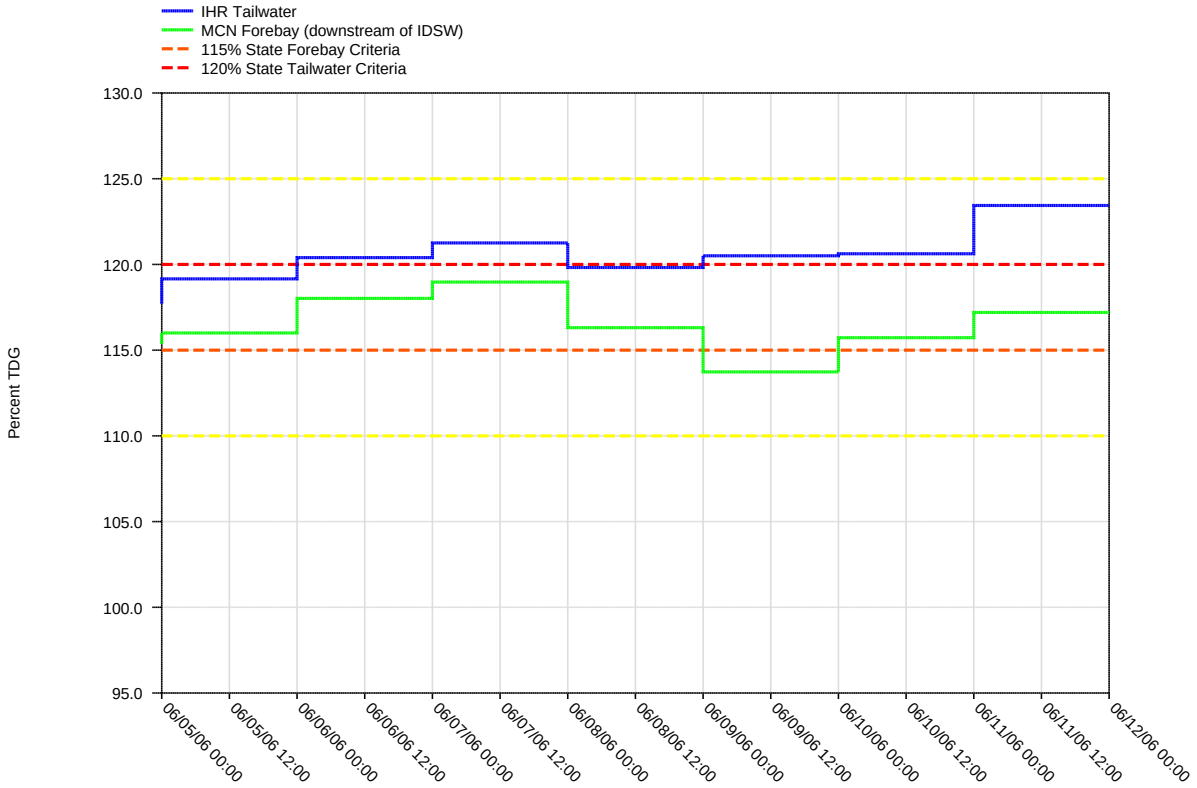


Figure 12.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

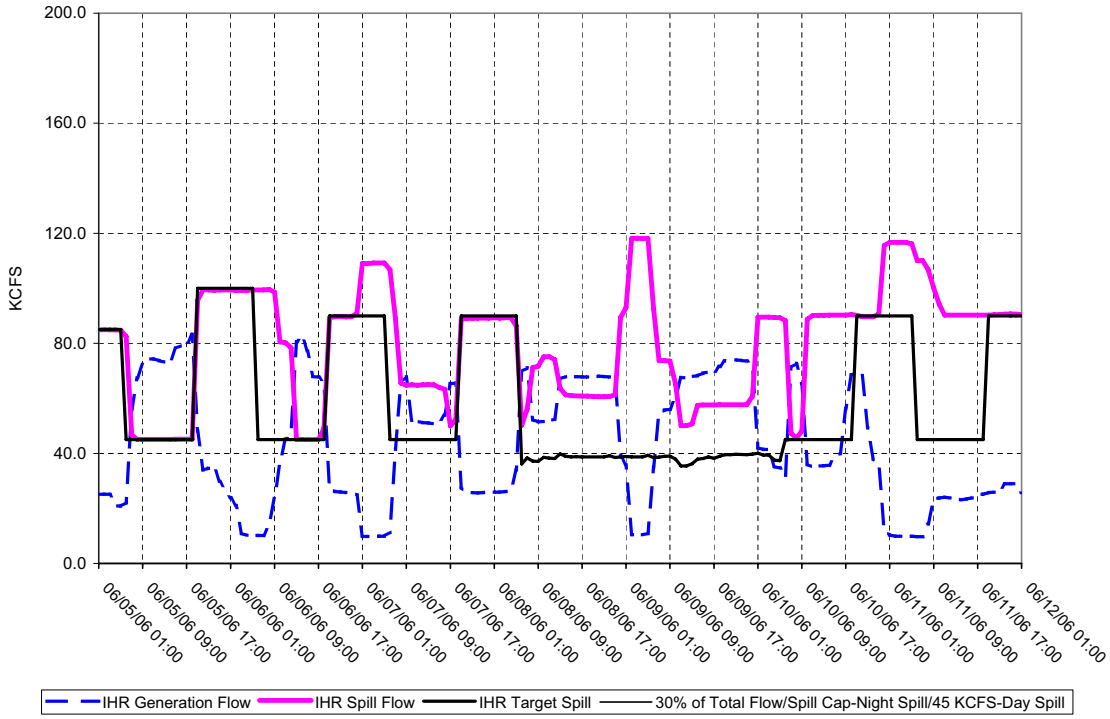
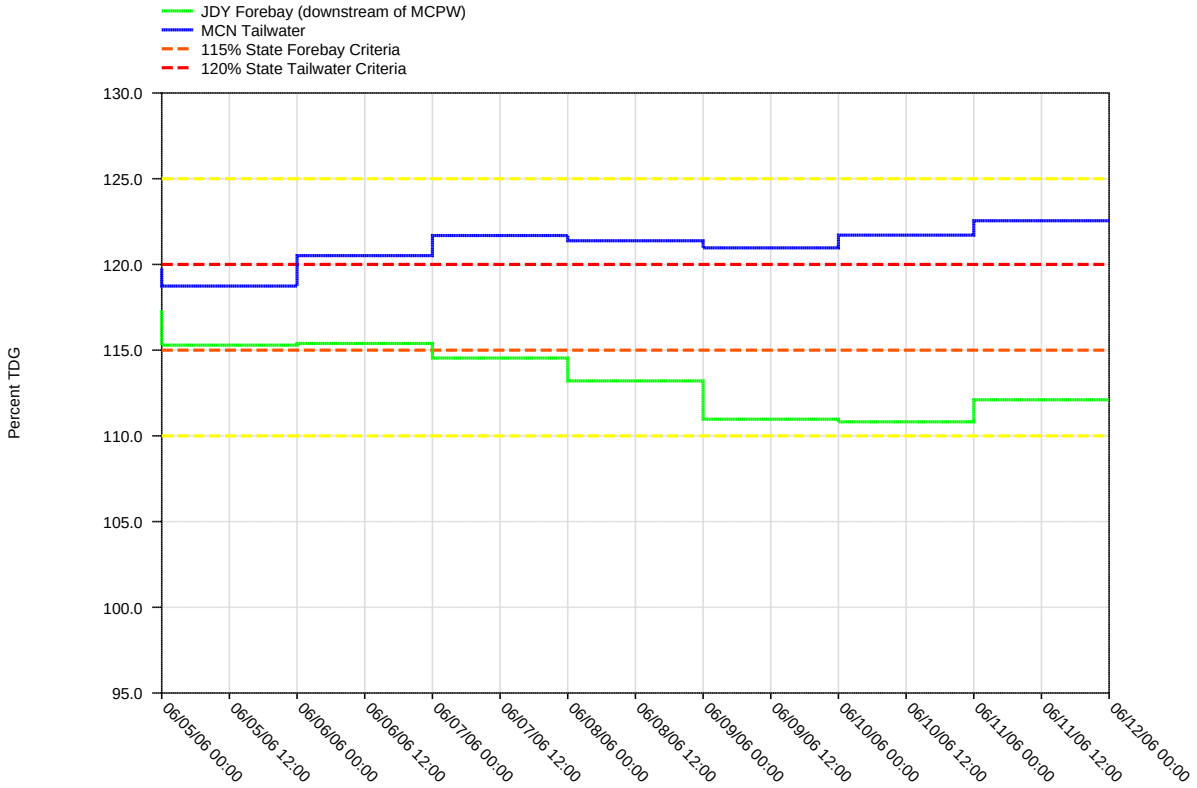


Figure 13.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

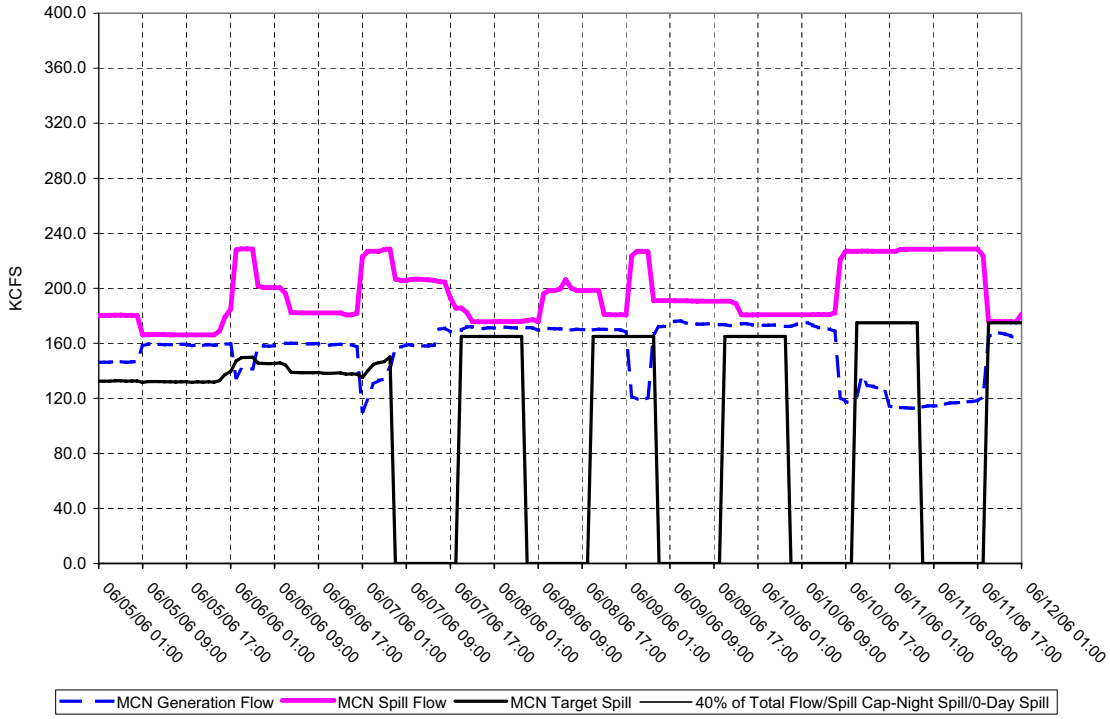
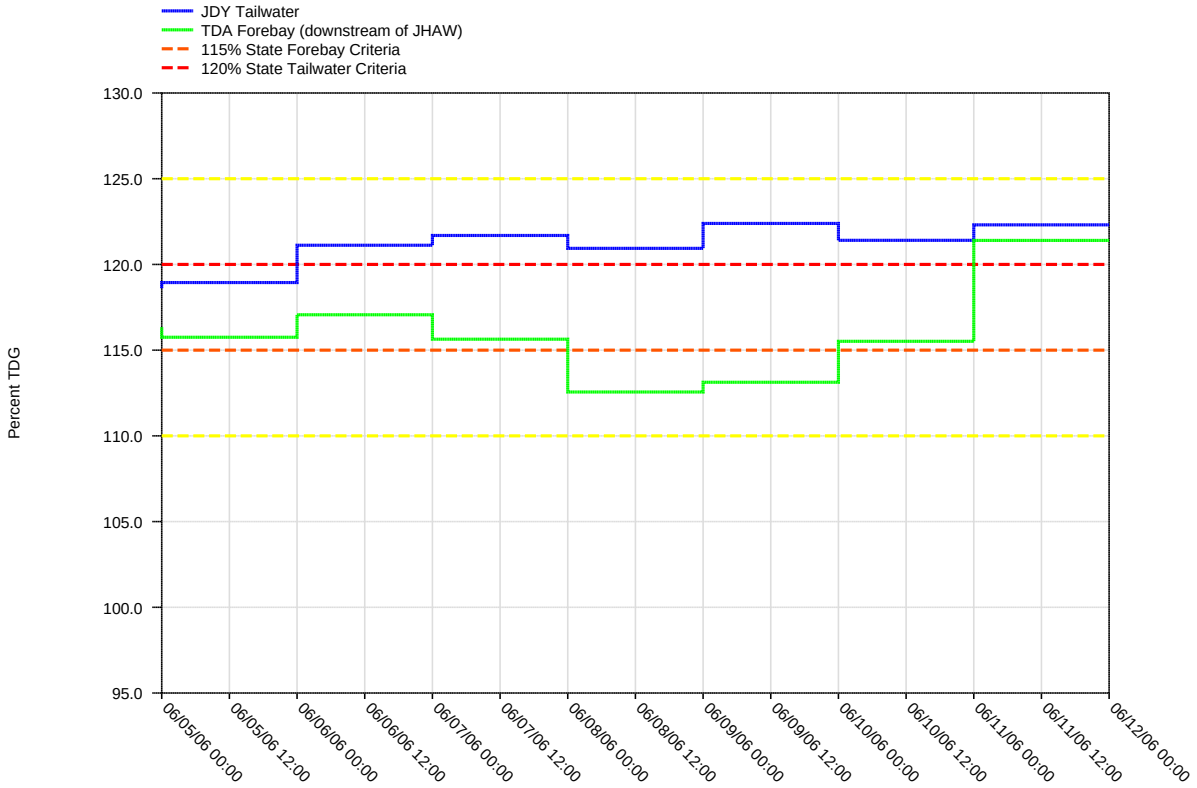


Figure 14.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

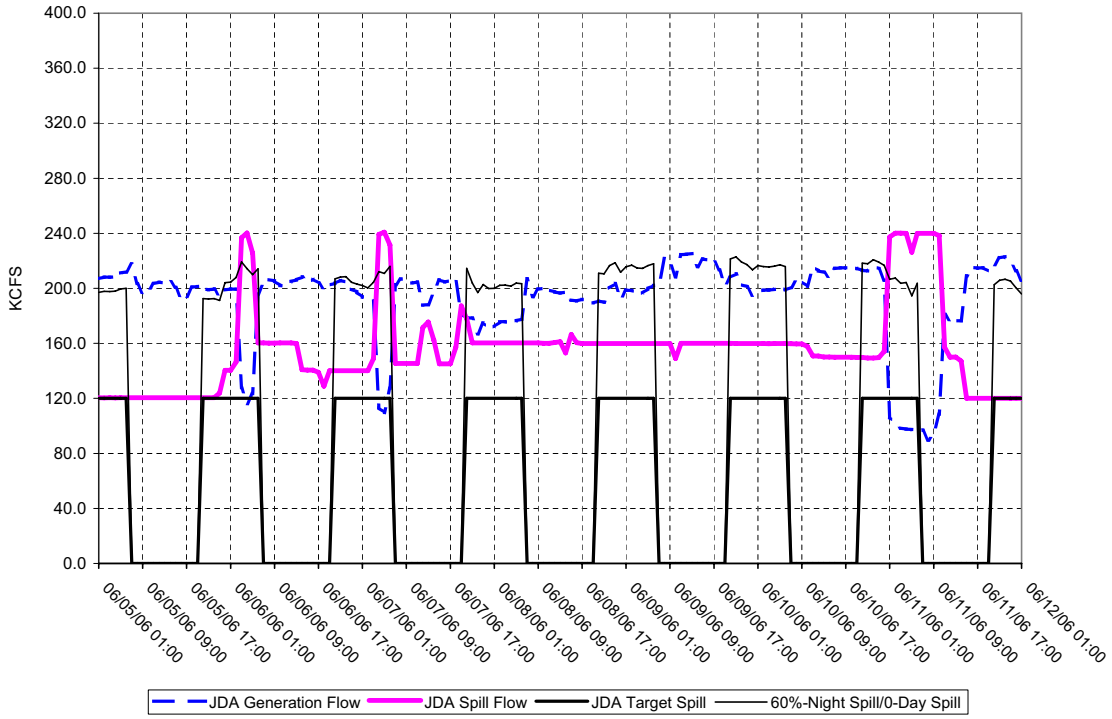
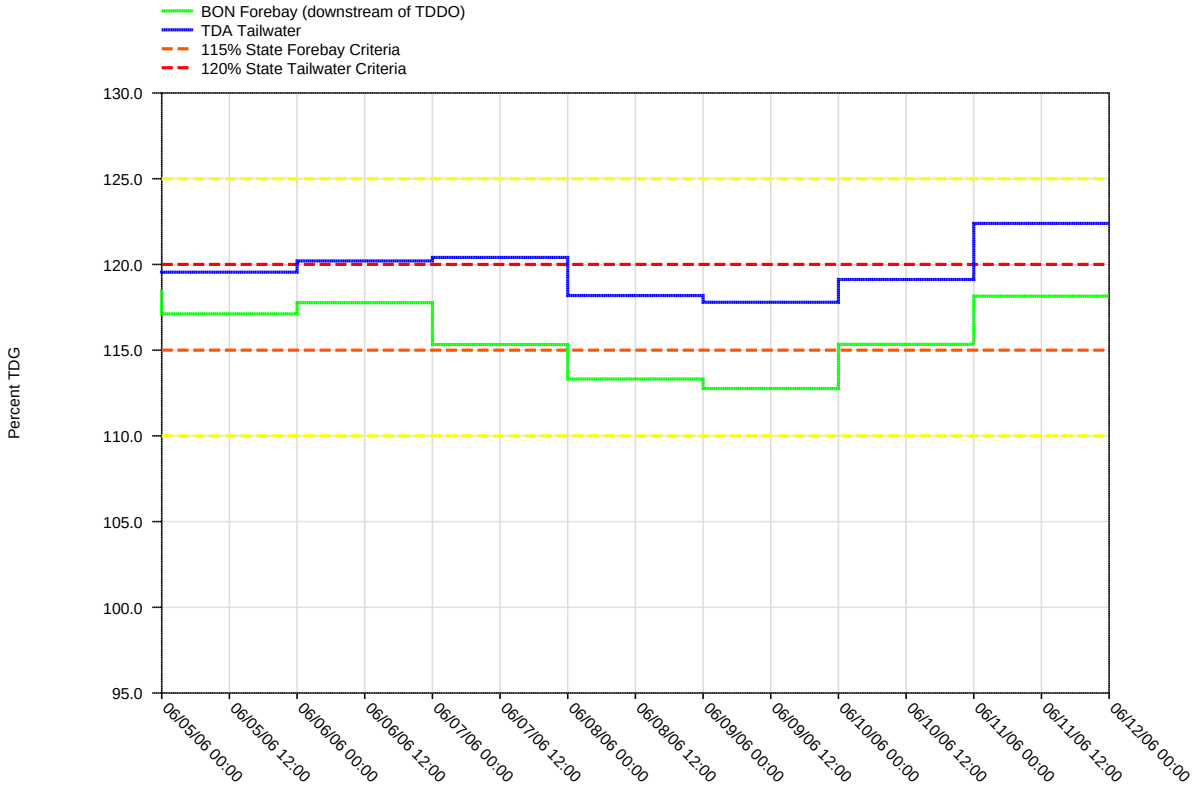


Figure 15.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

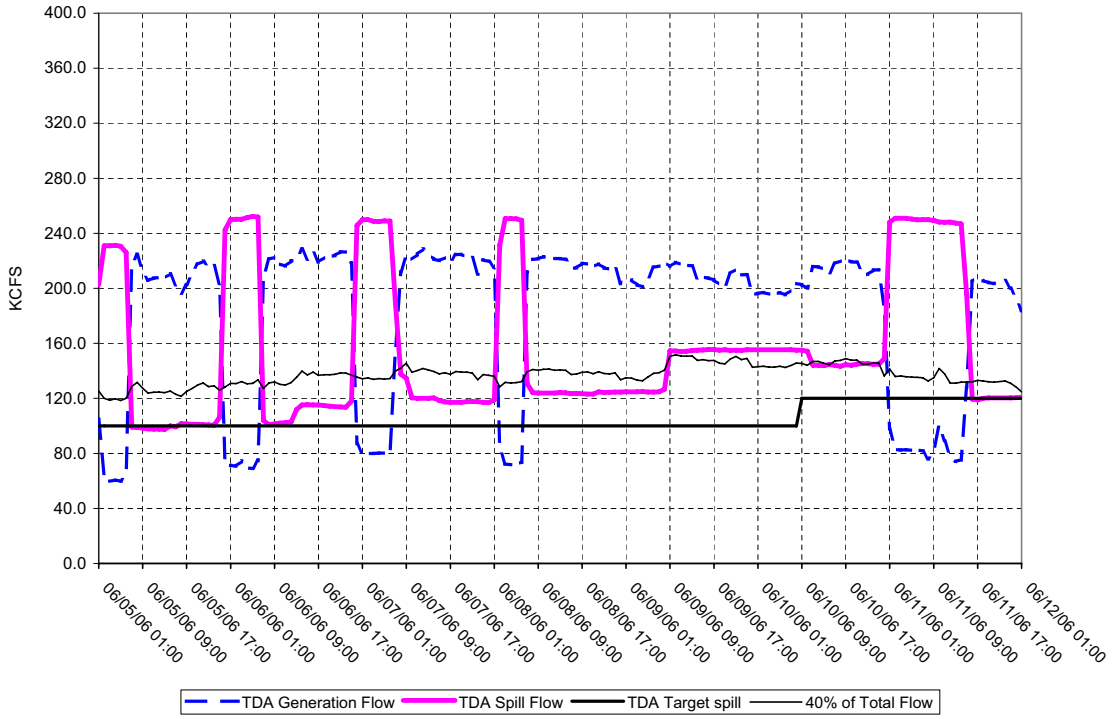
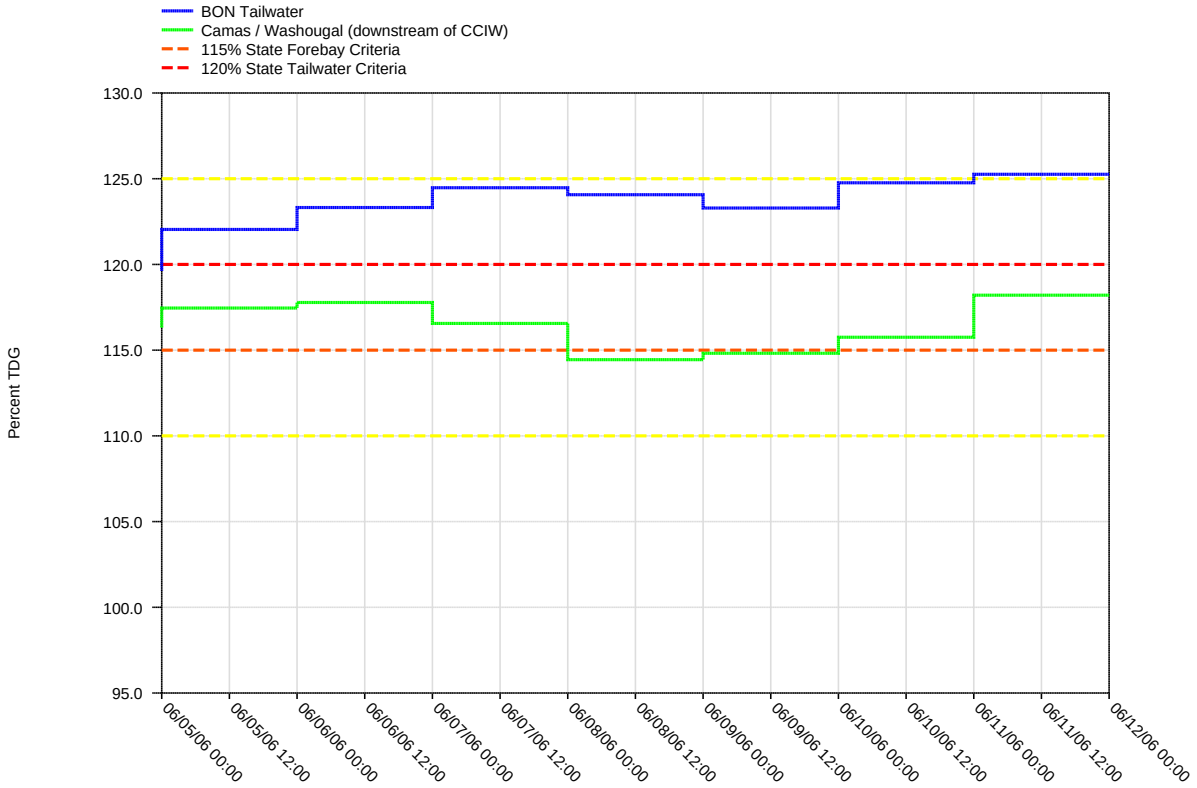


Figure 16.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

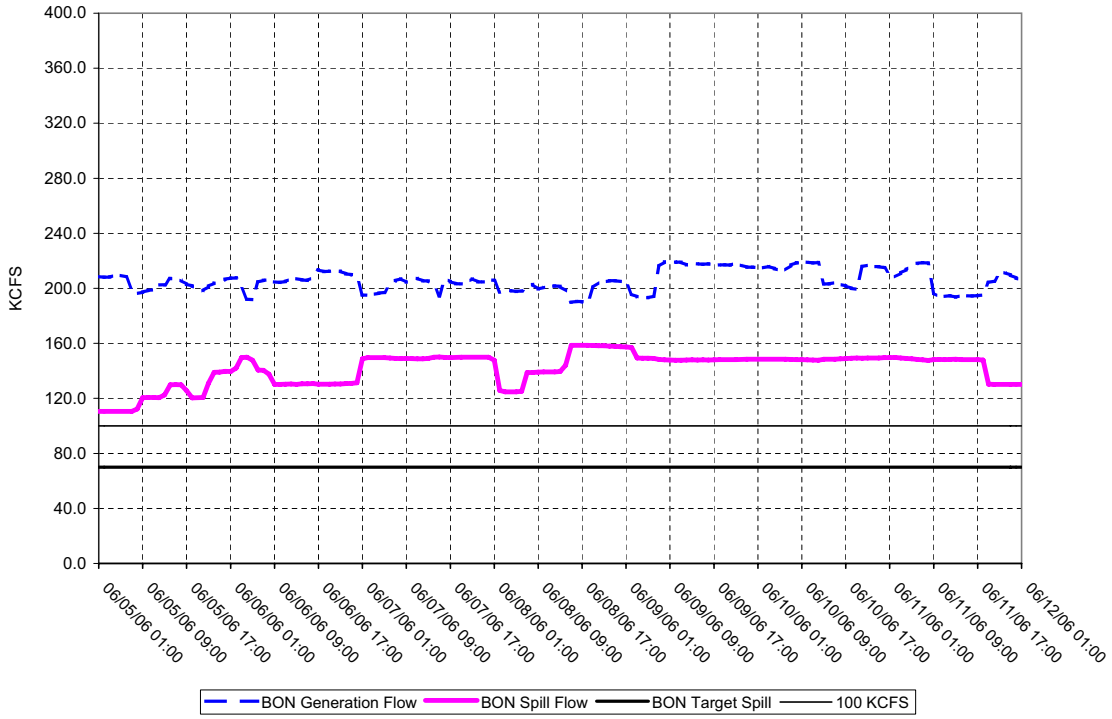
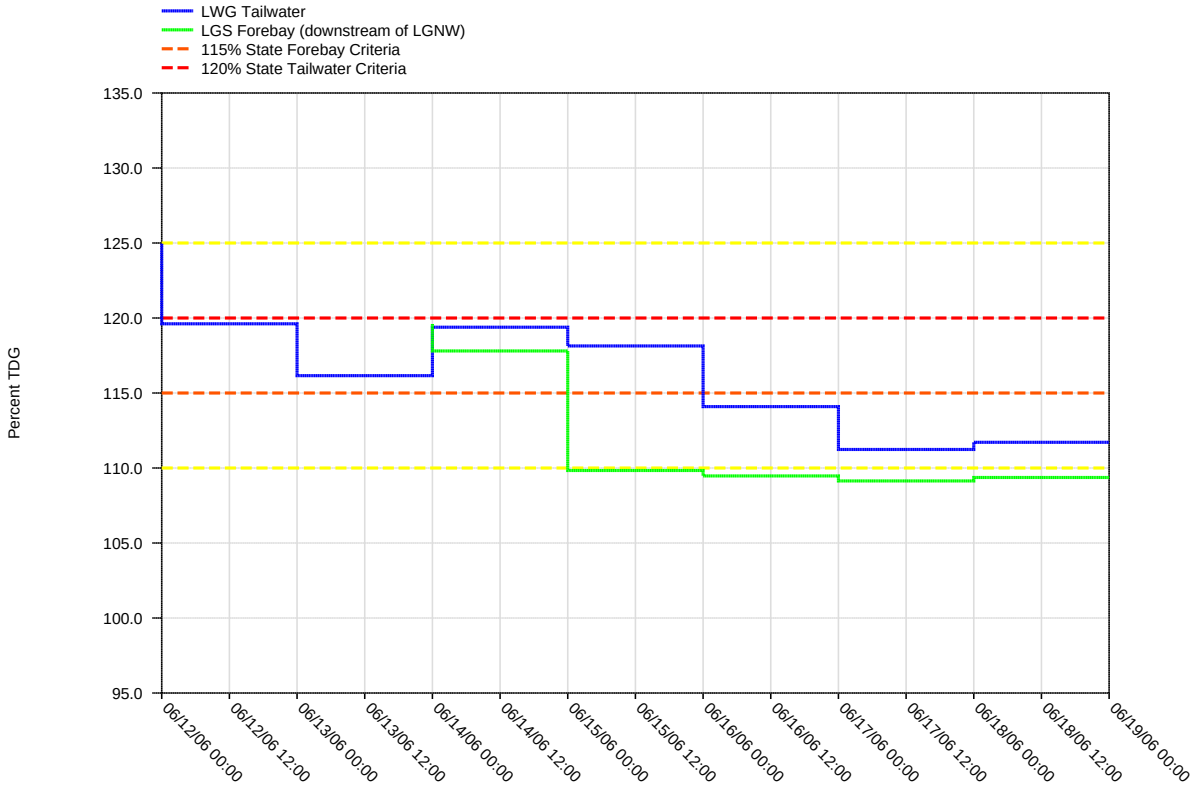


Figure 17.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

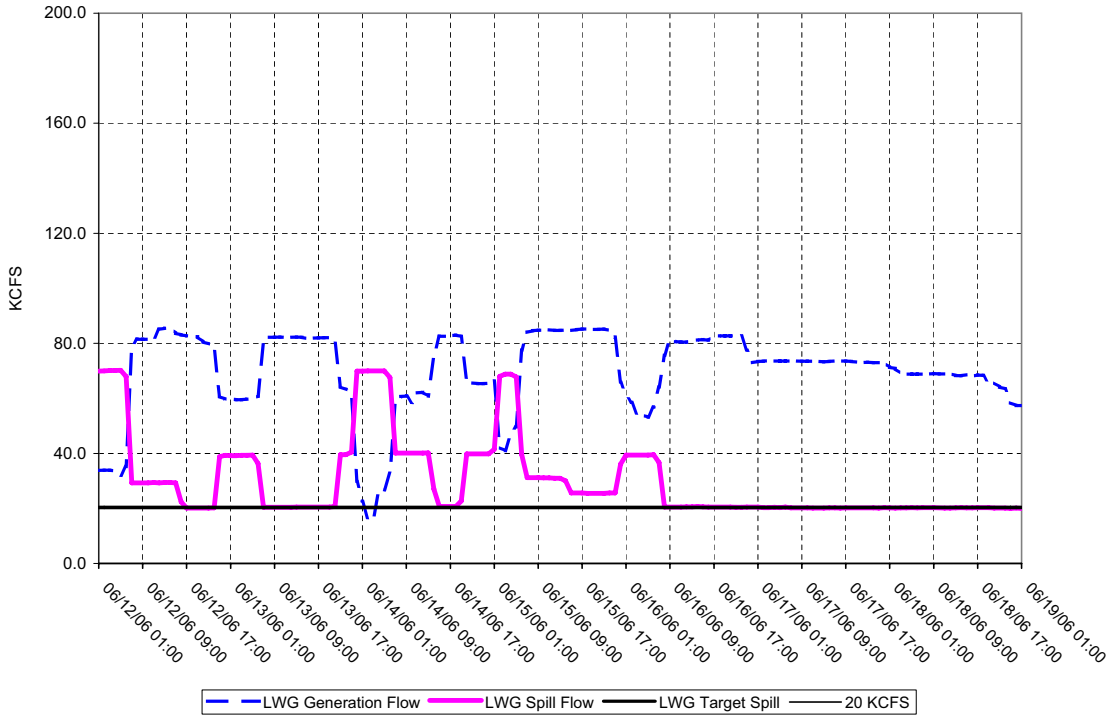
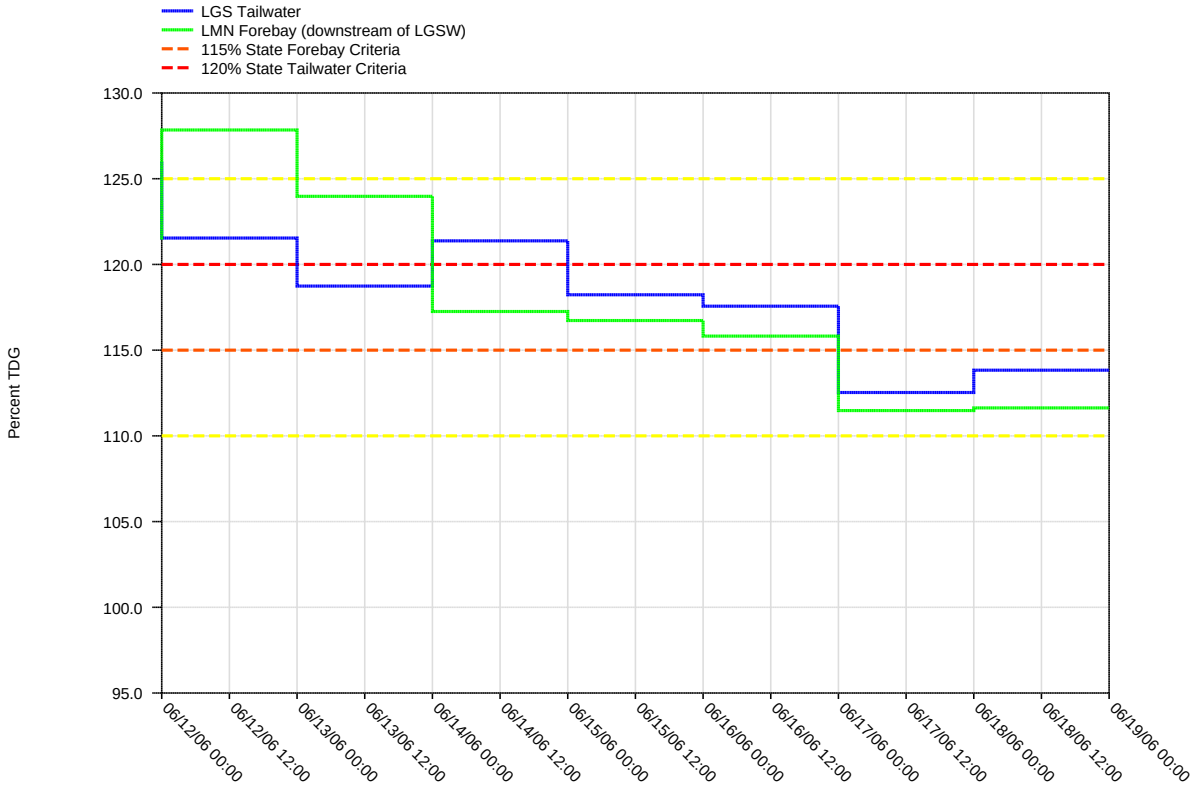


Figure 18.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

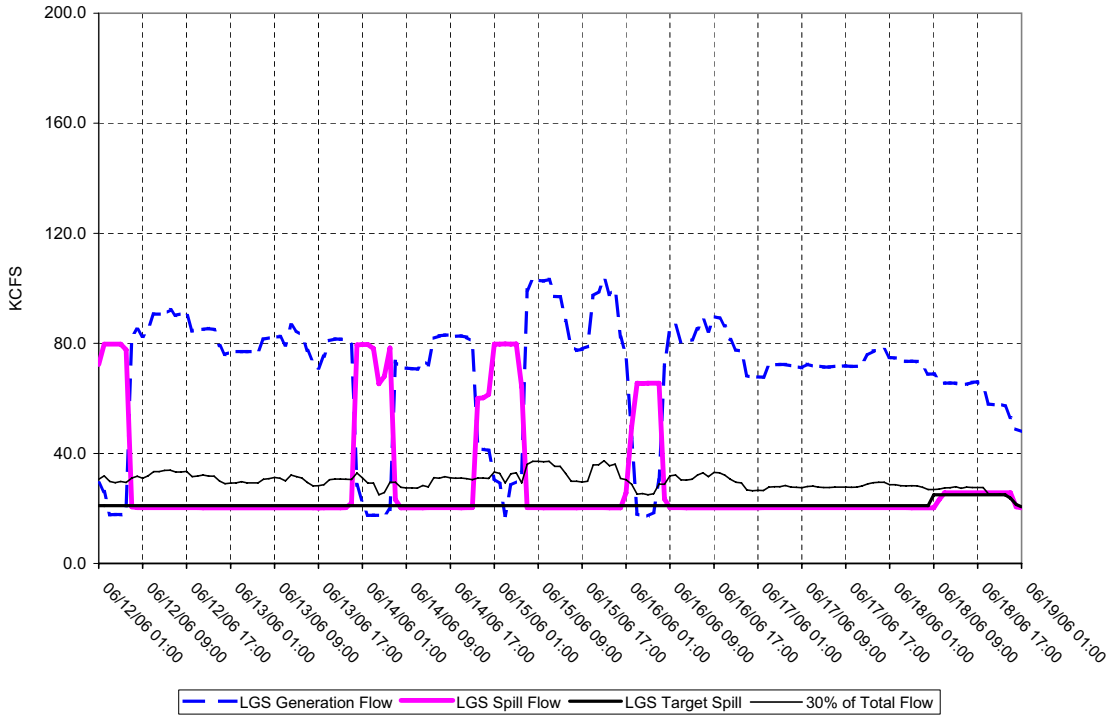
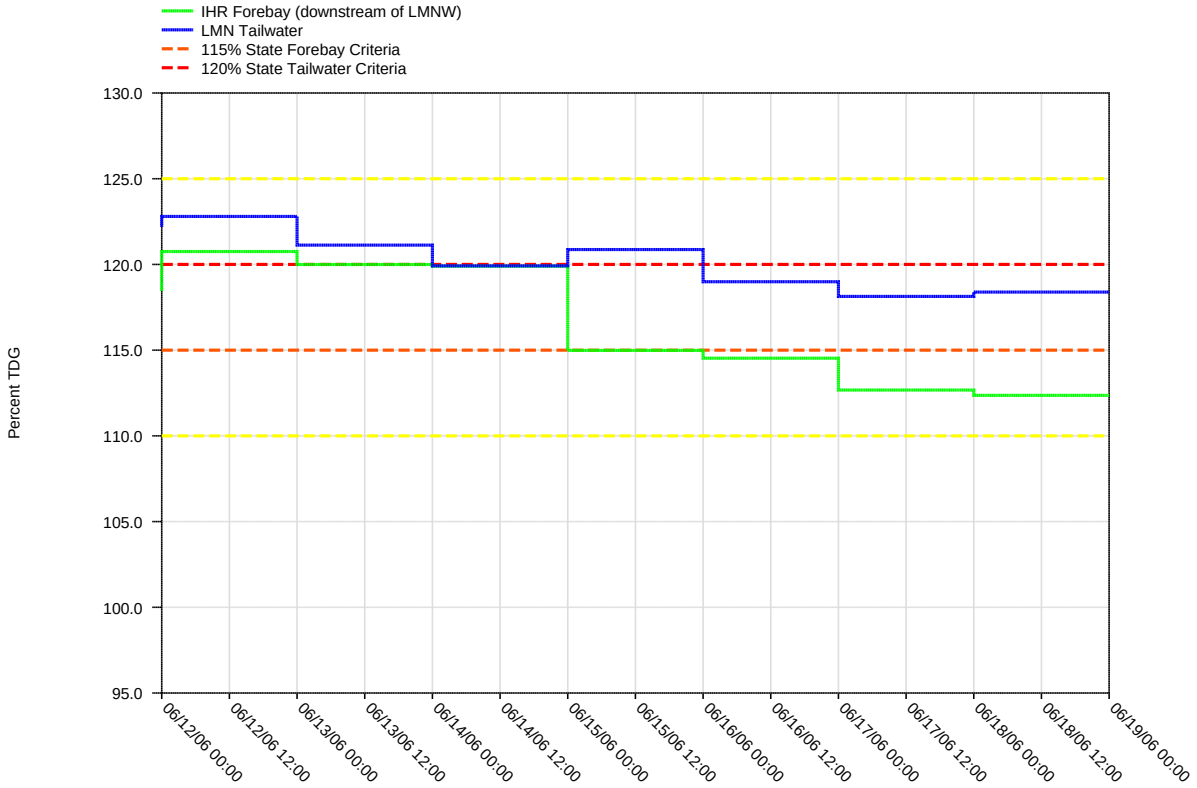


Figure 19.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

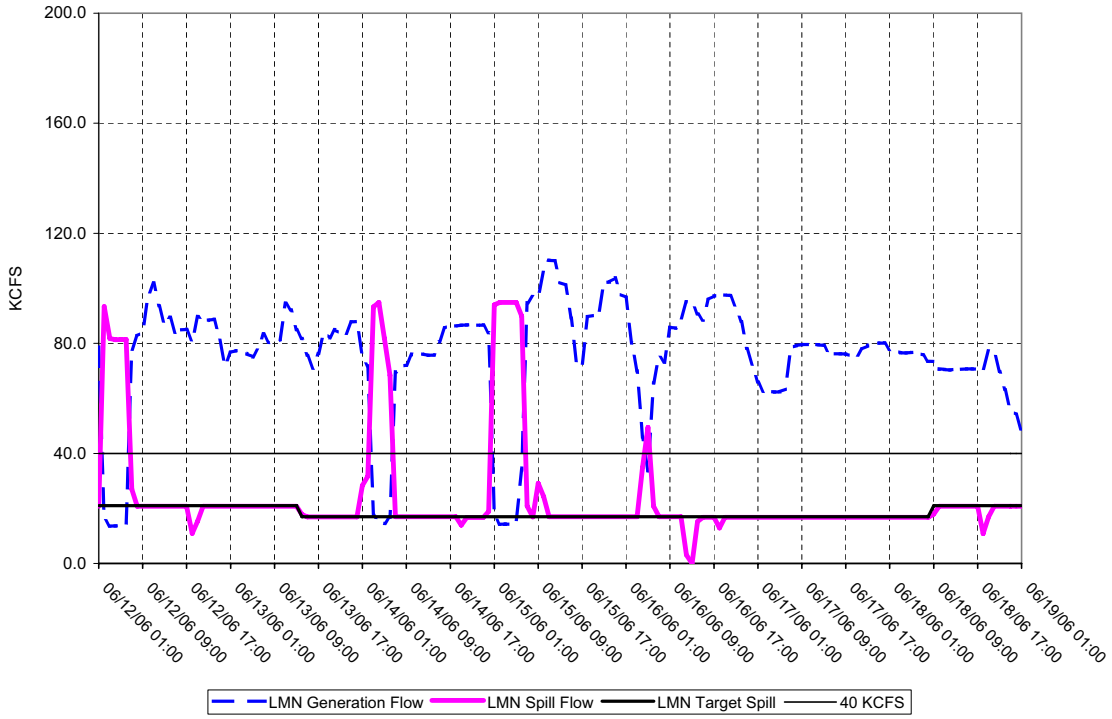
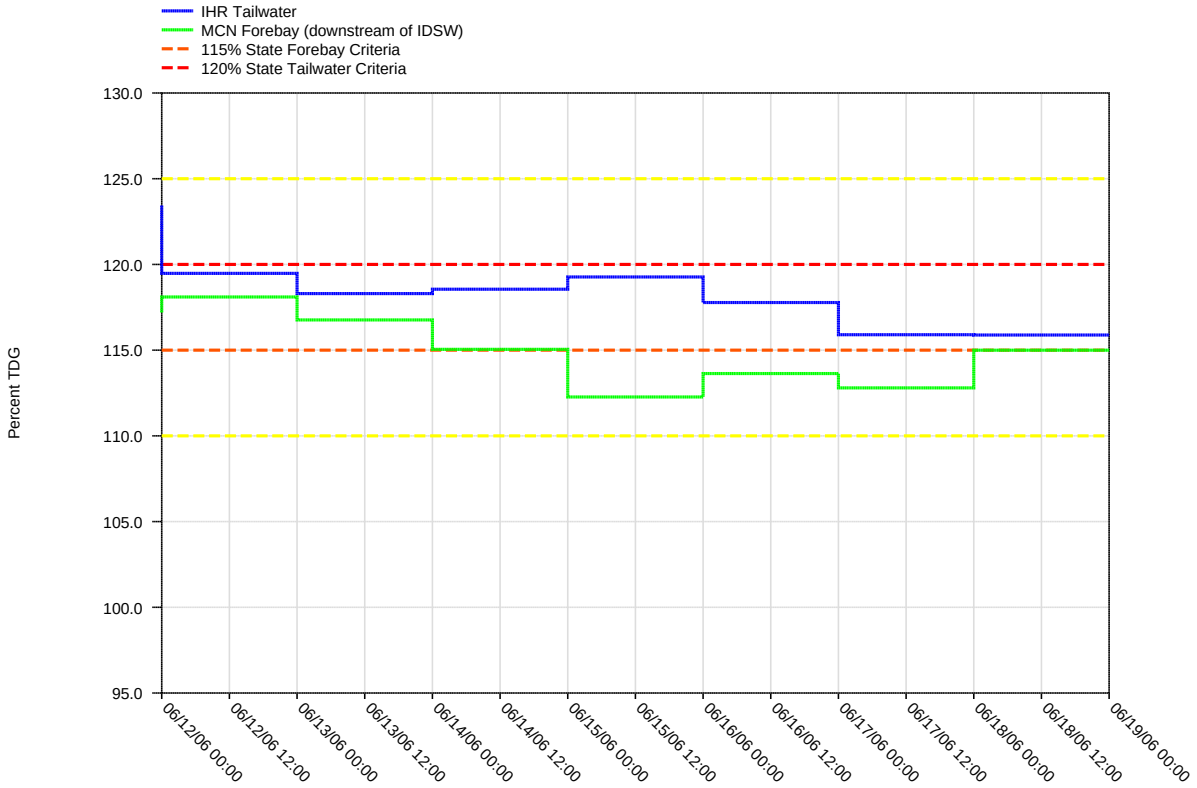


Figure 20.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

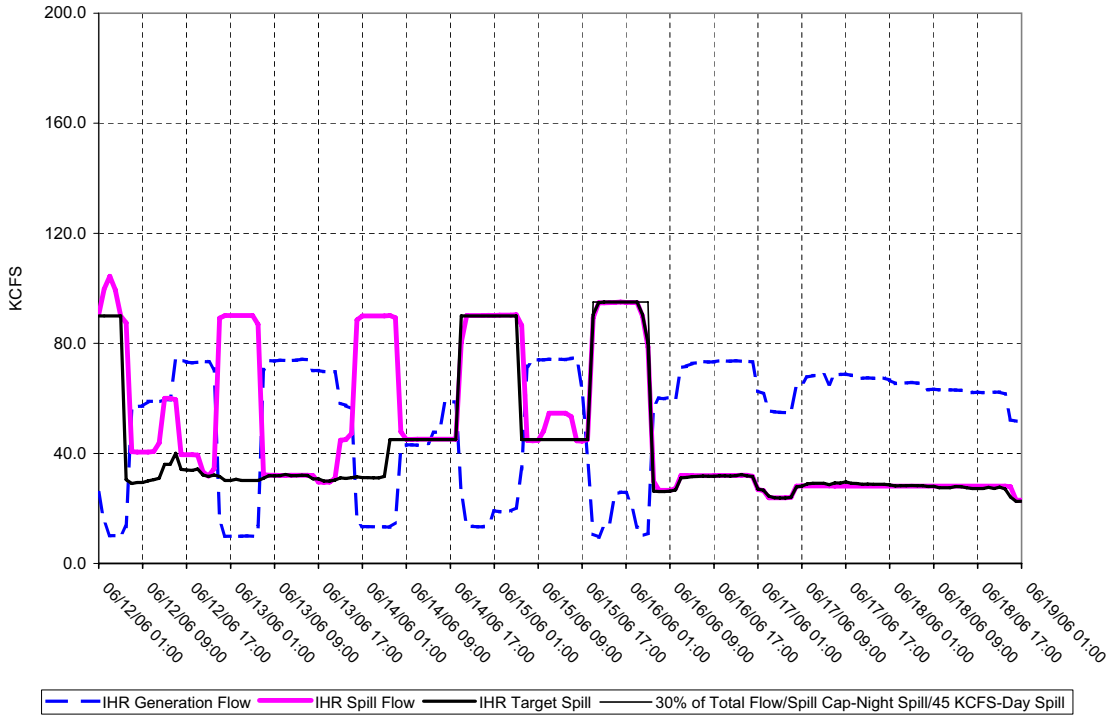
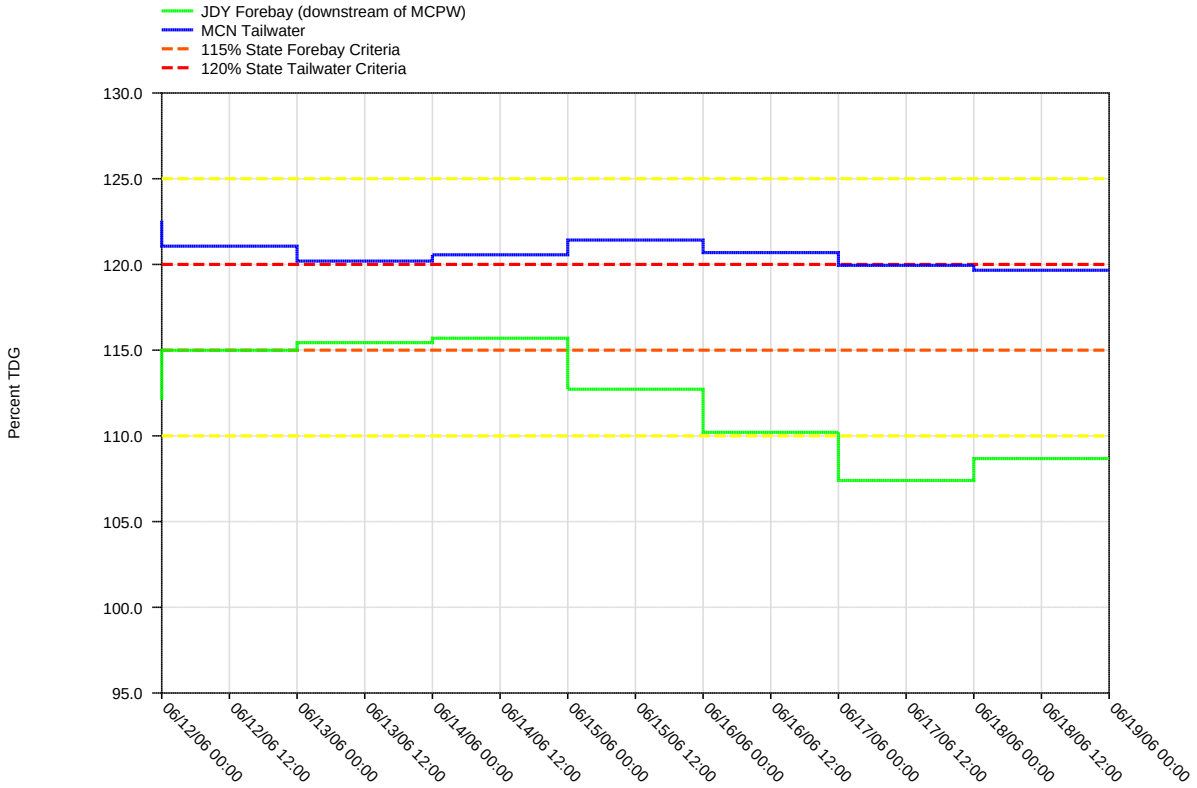


Figure 21.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

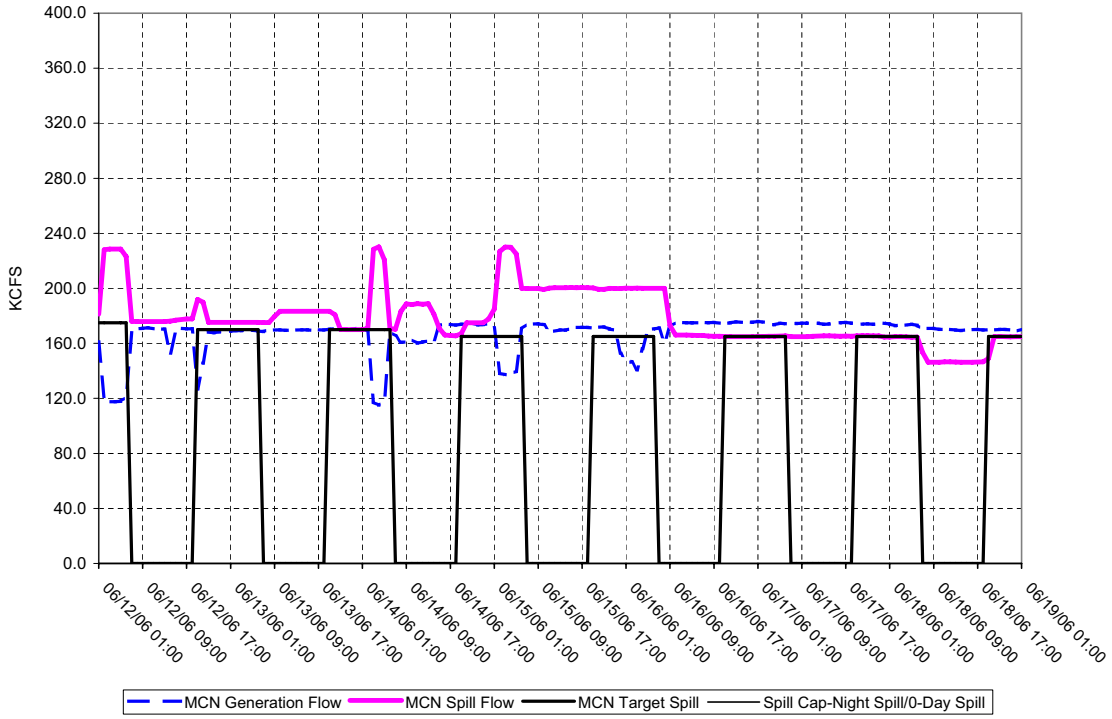
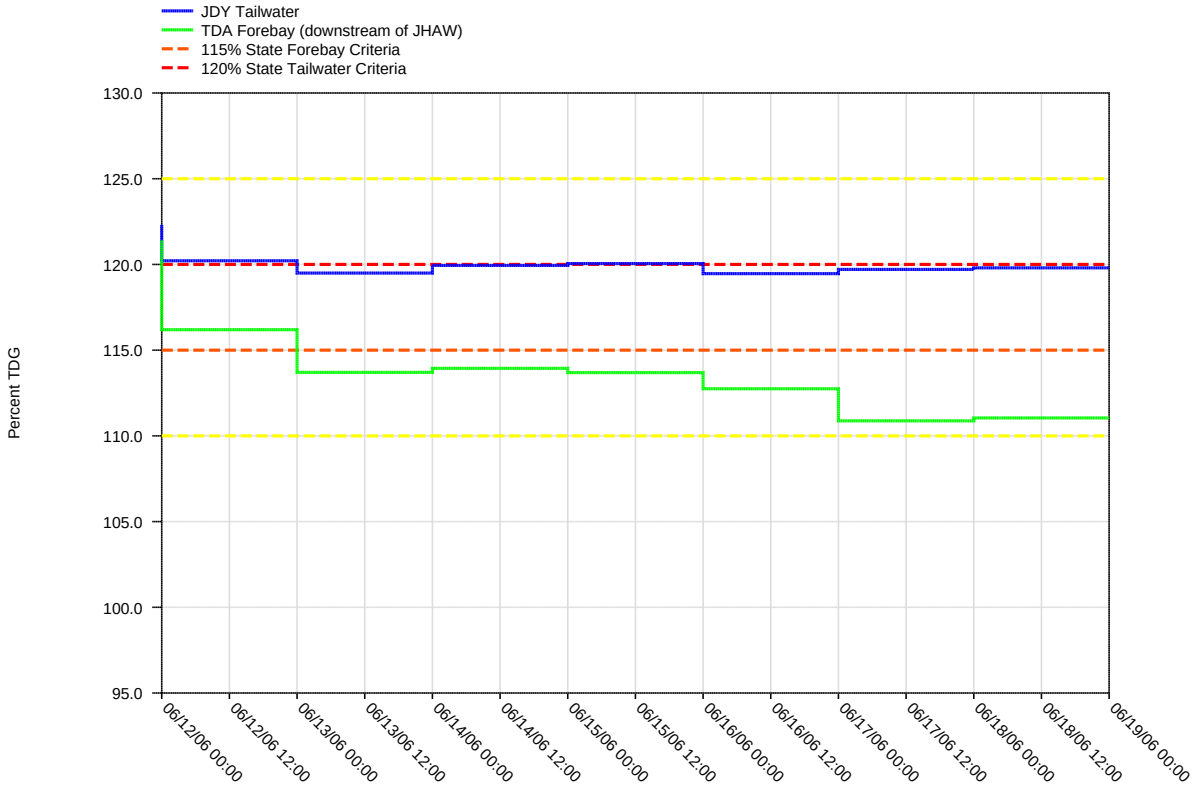


Figure 22.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

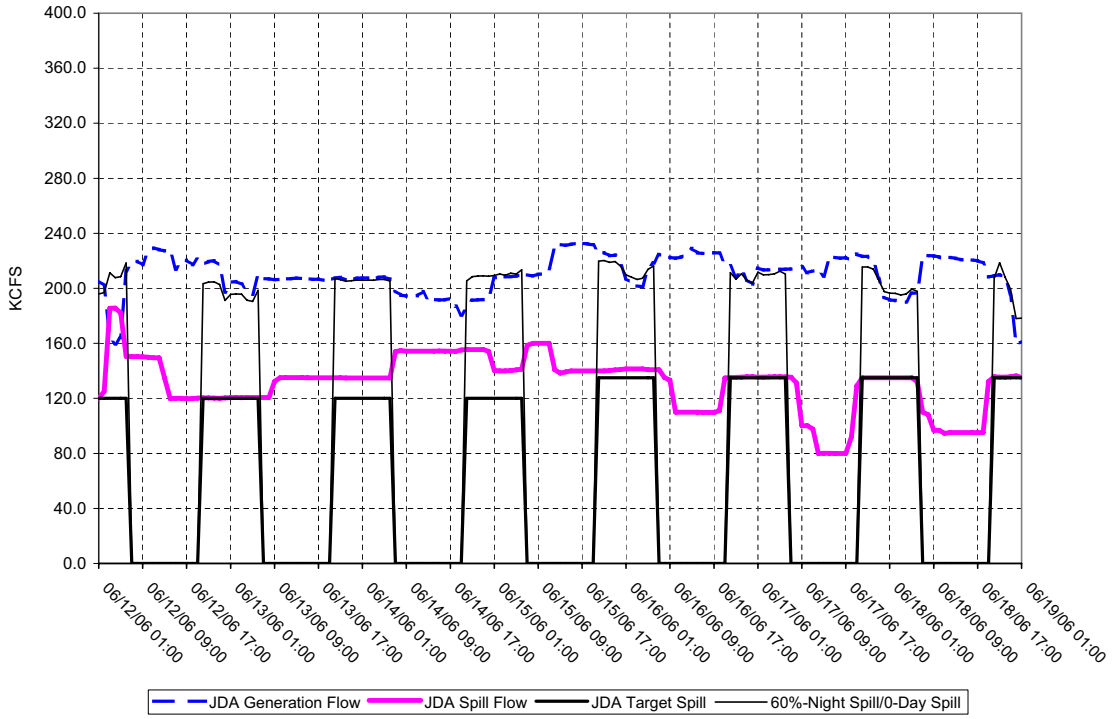
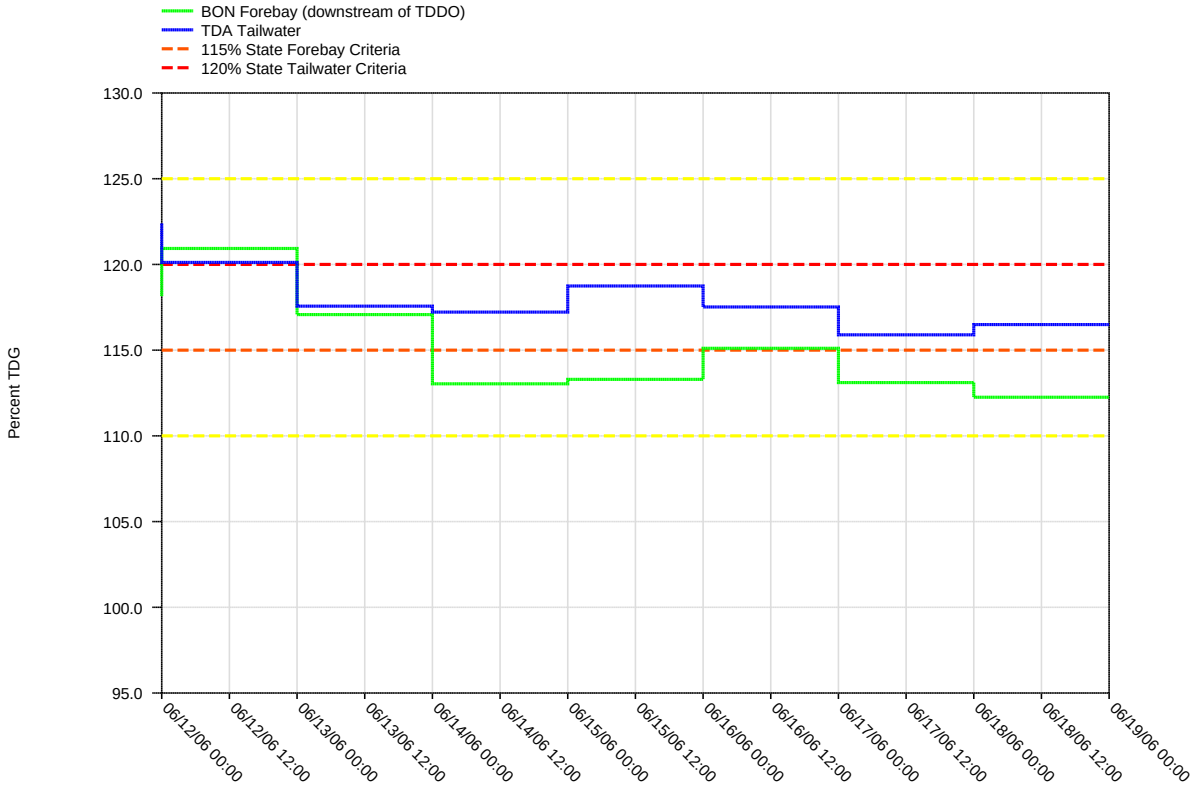


Figure 23.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

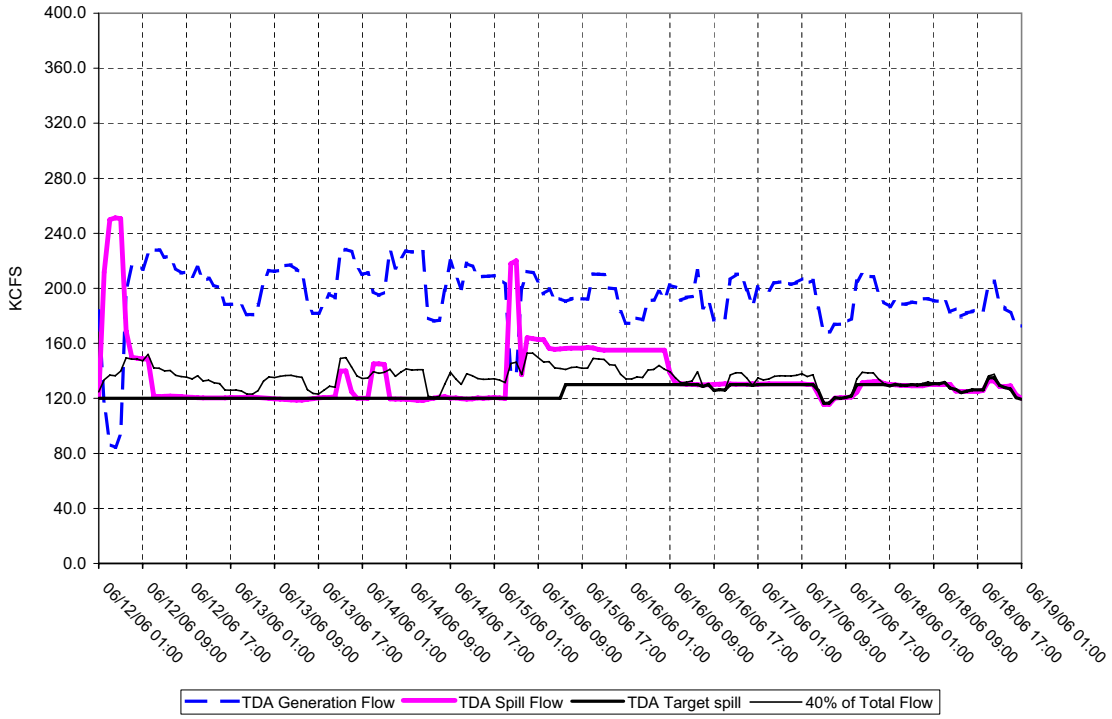
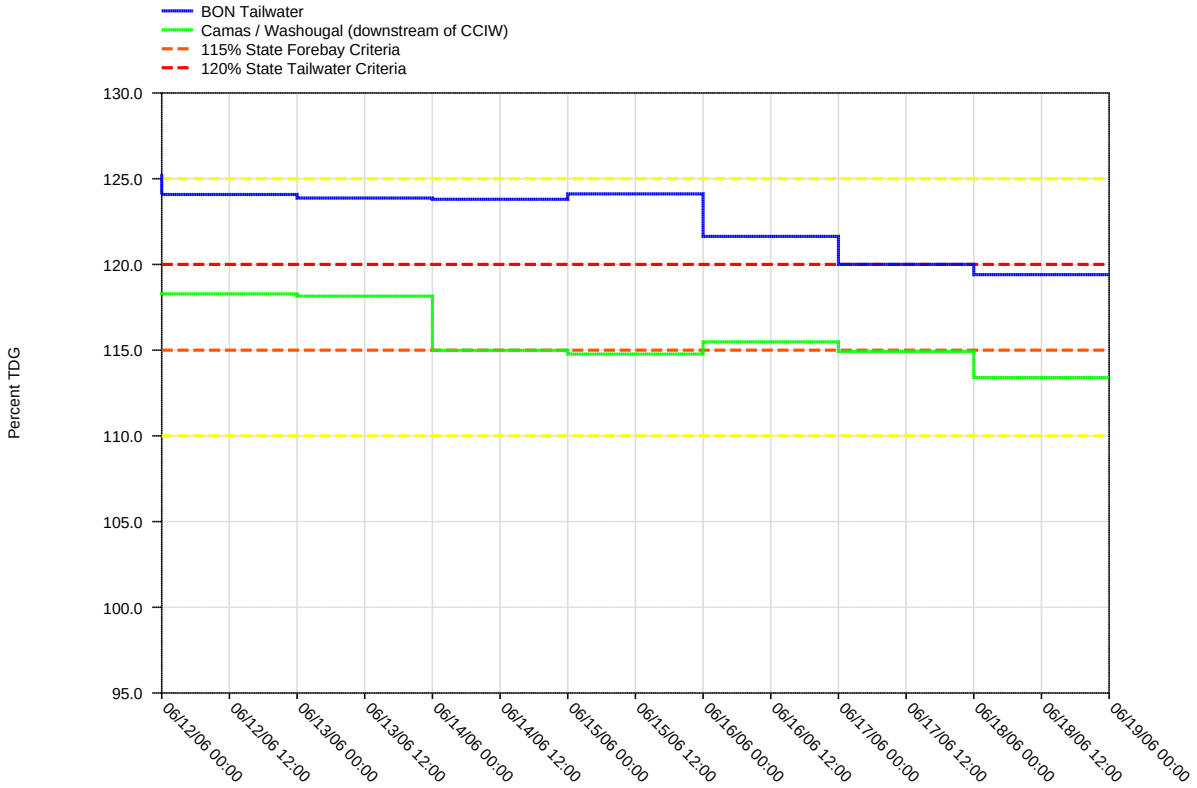


Figure 24.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

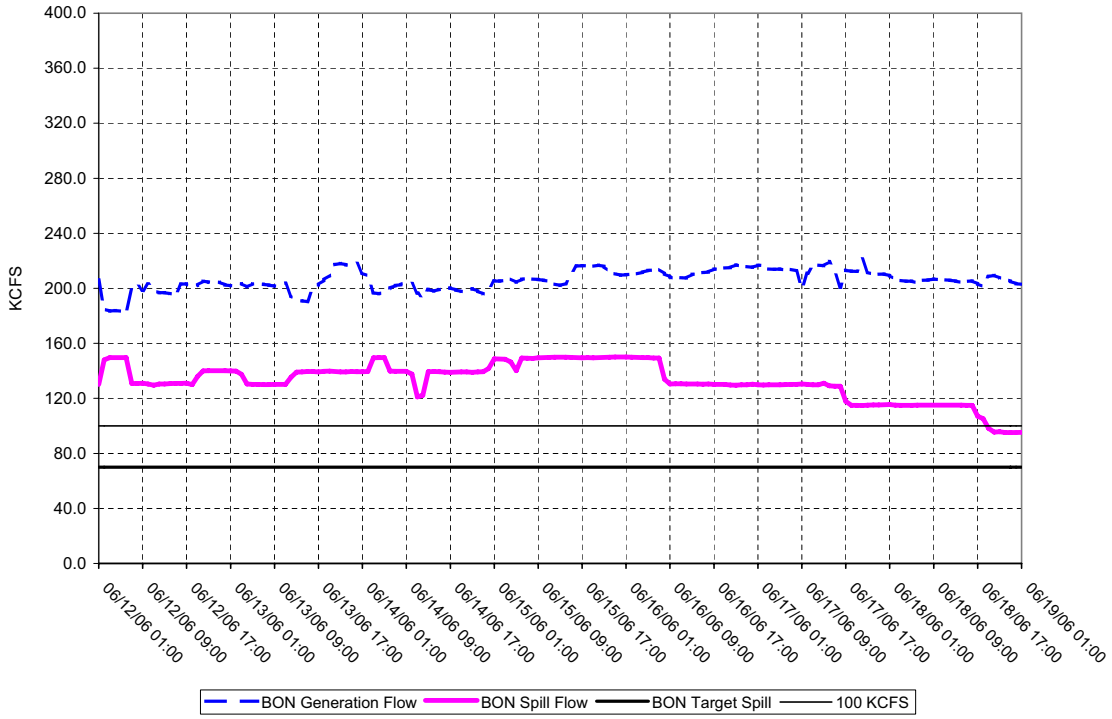
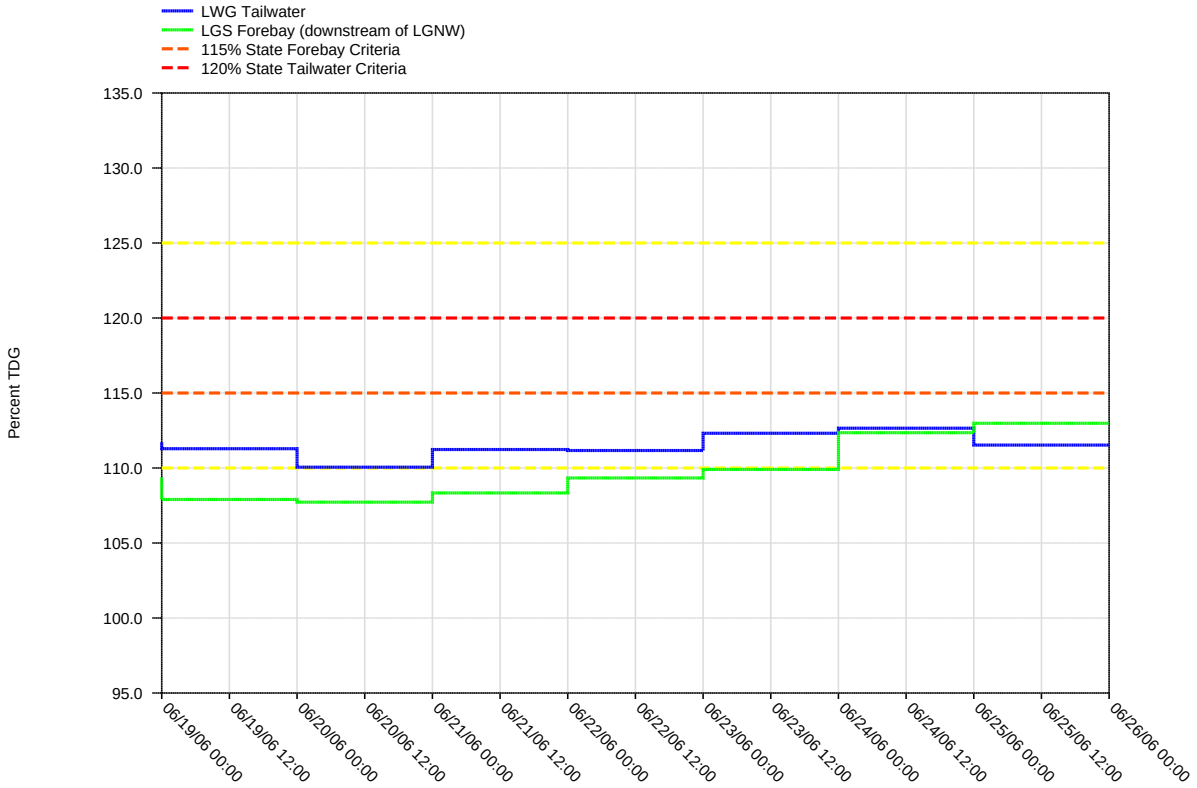
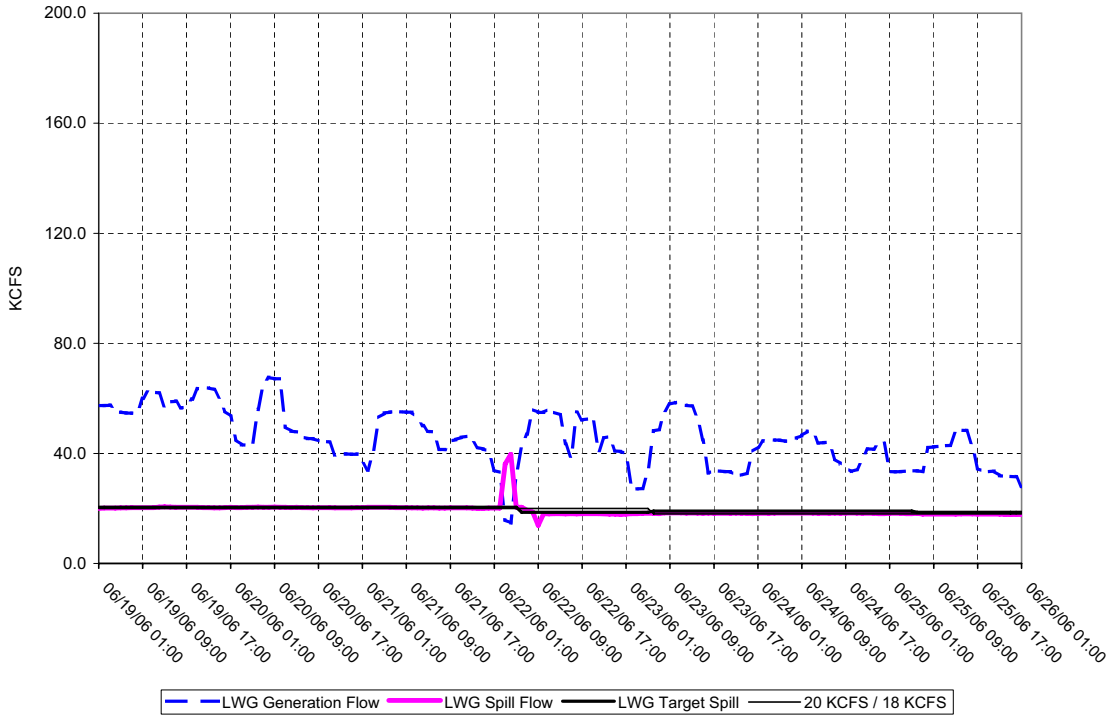


Figure 25.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



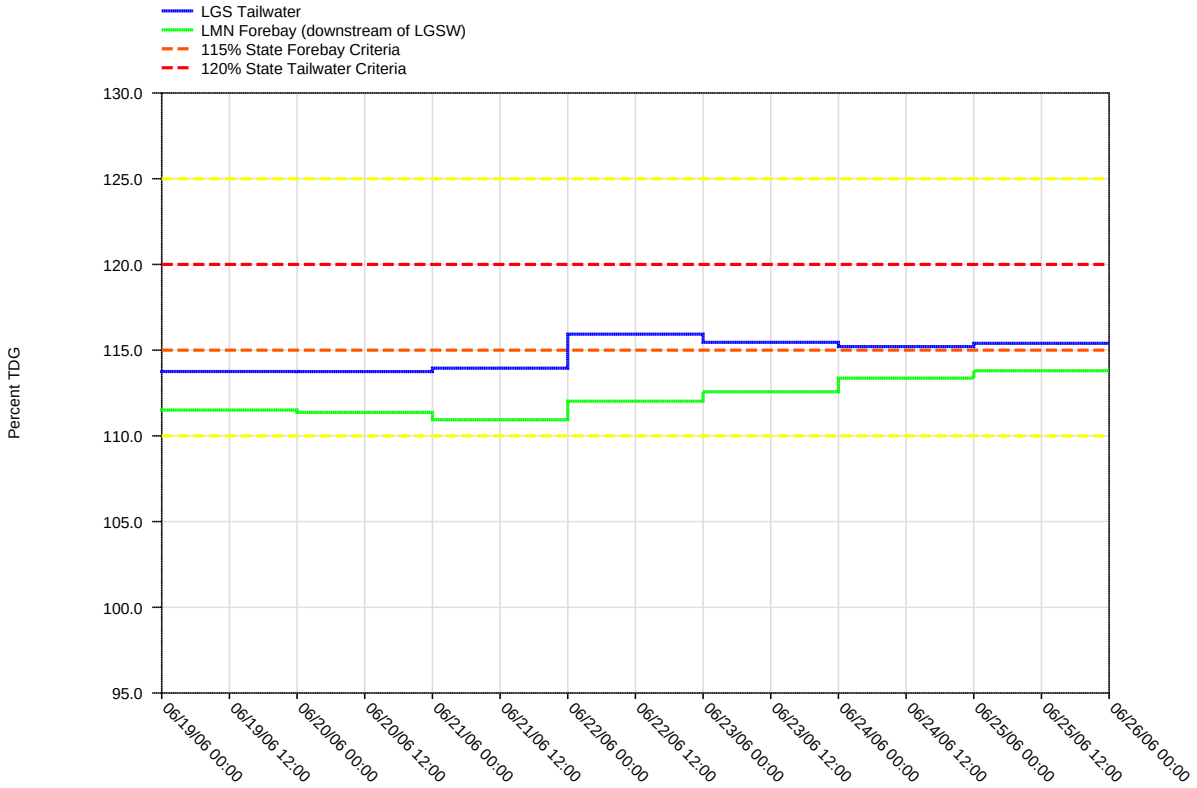
LOWER GRANITE DAM - Hourly Spill and Flow



Summer Spill Began 22 June at 0600 Hours

Figure 26.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

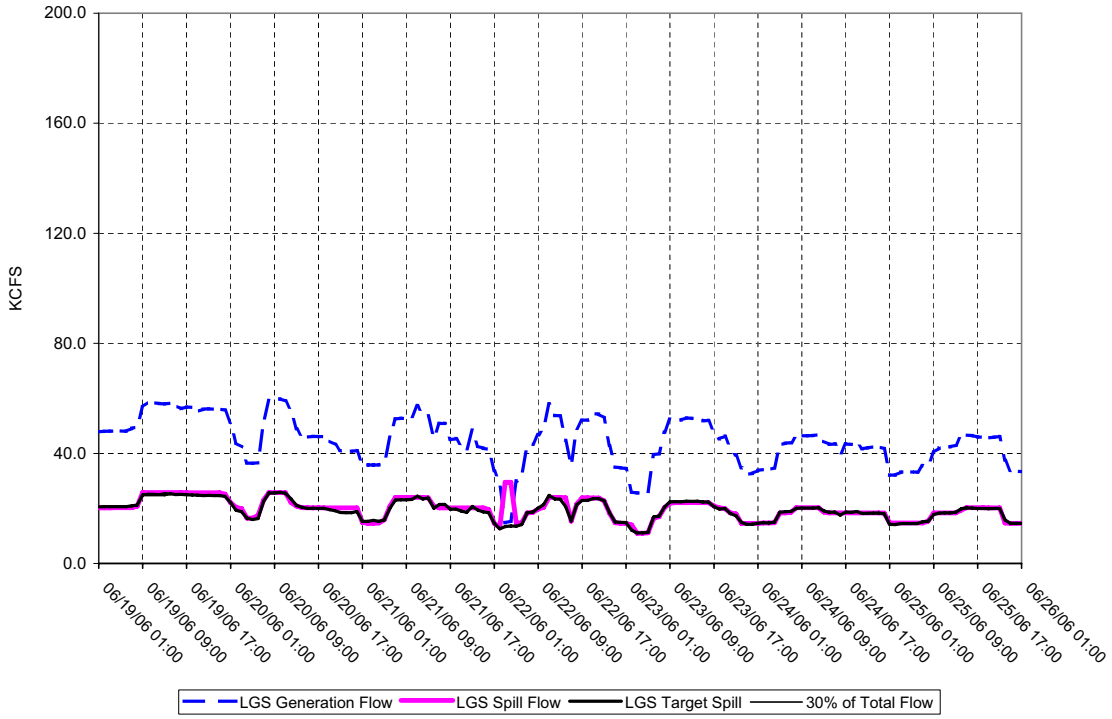
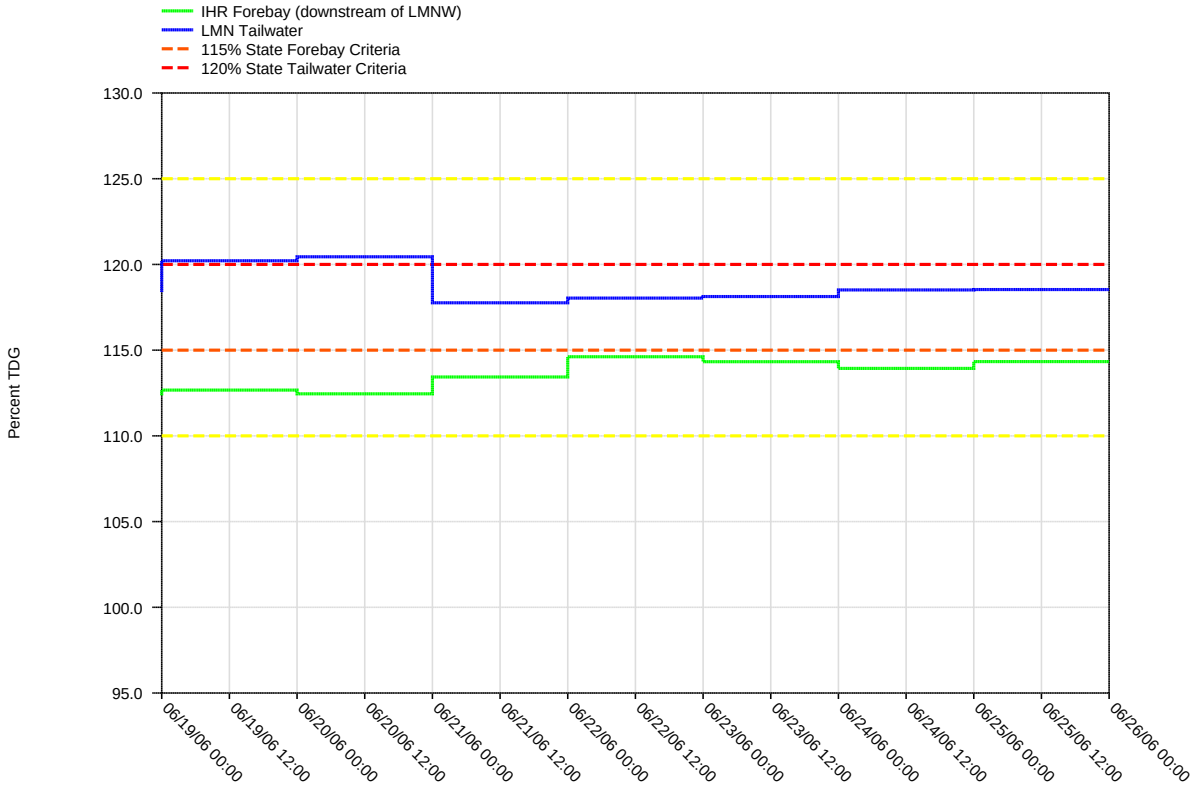
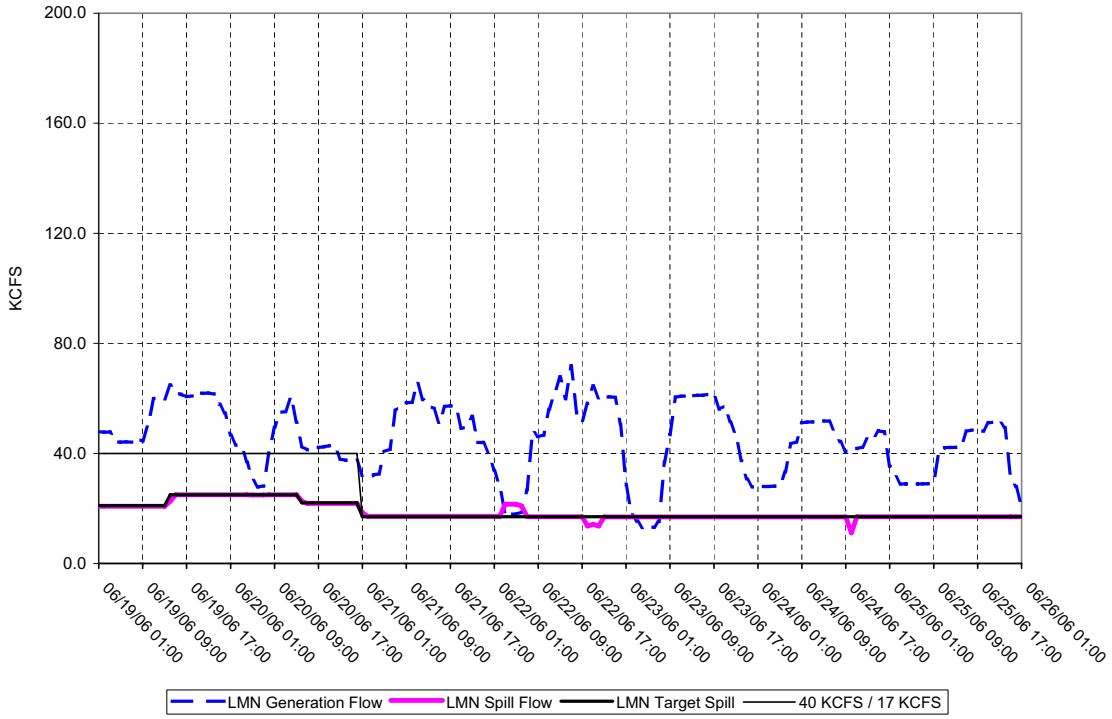


Figure 27.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



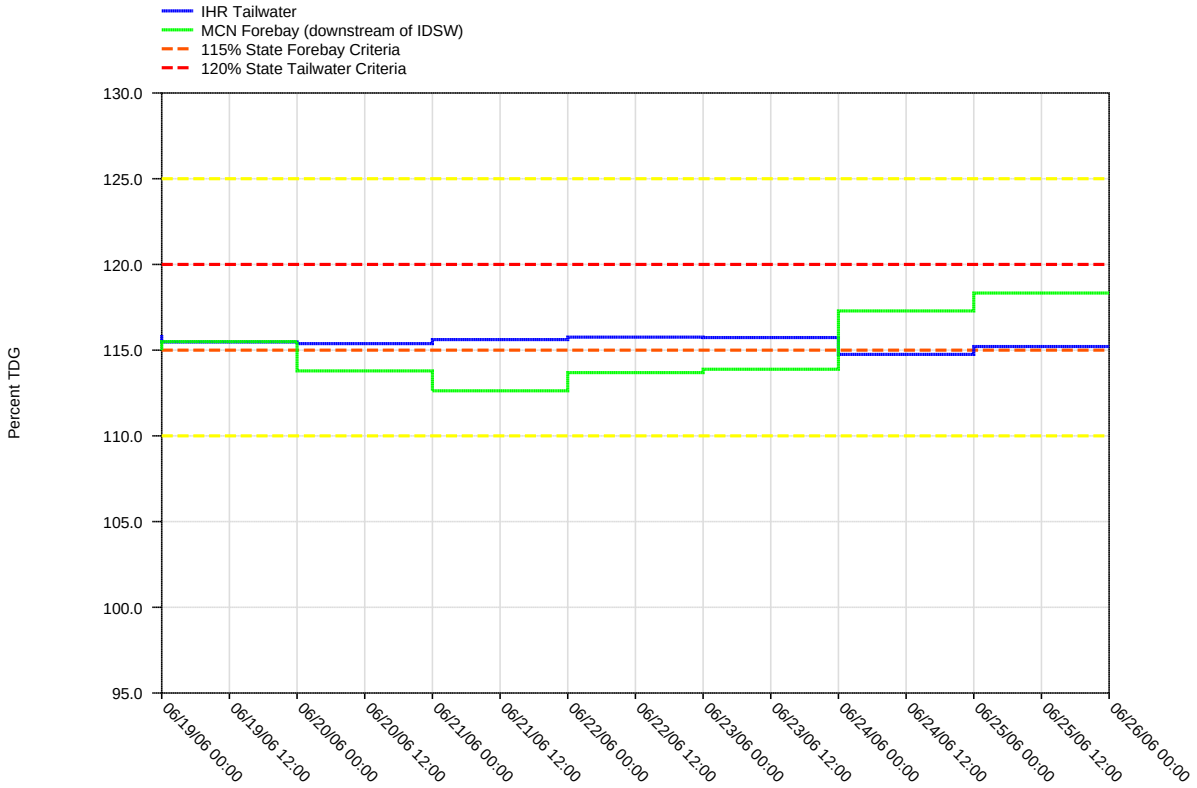
LOWER MONUMENTAL DAM - Hourly Spill and Flow



Summer Spill Began 21 June at 0001 Hours

Figure 28.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

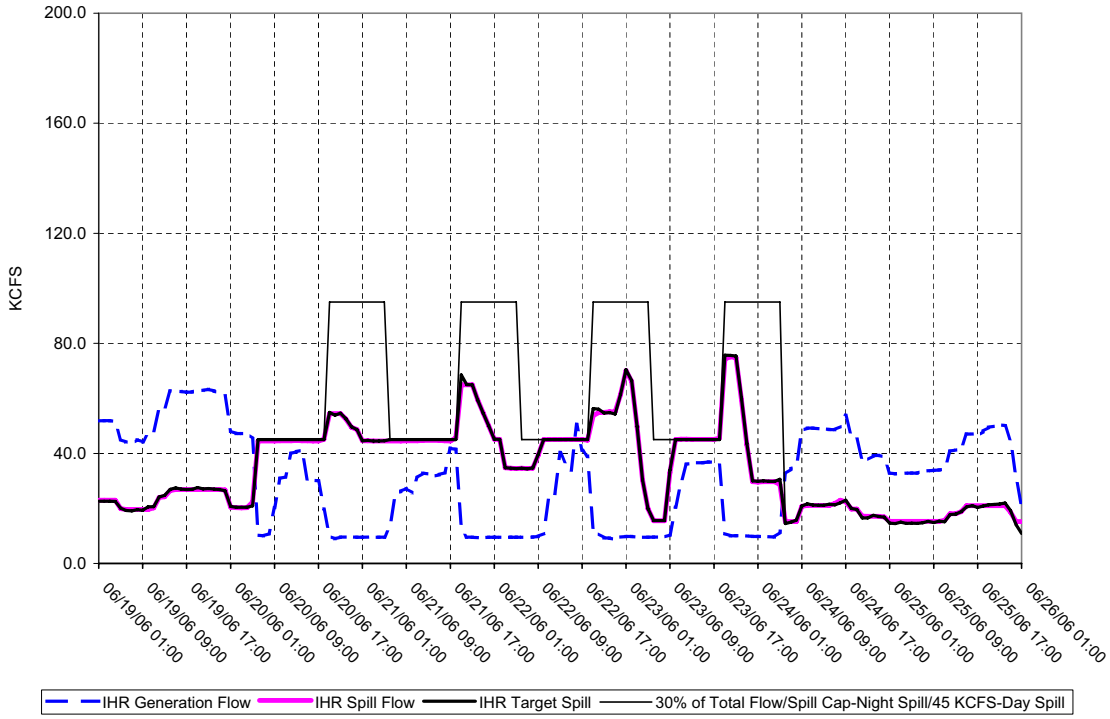
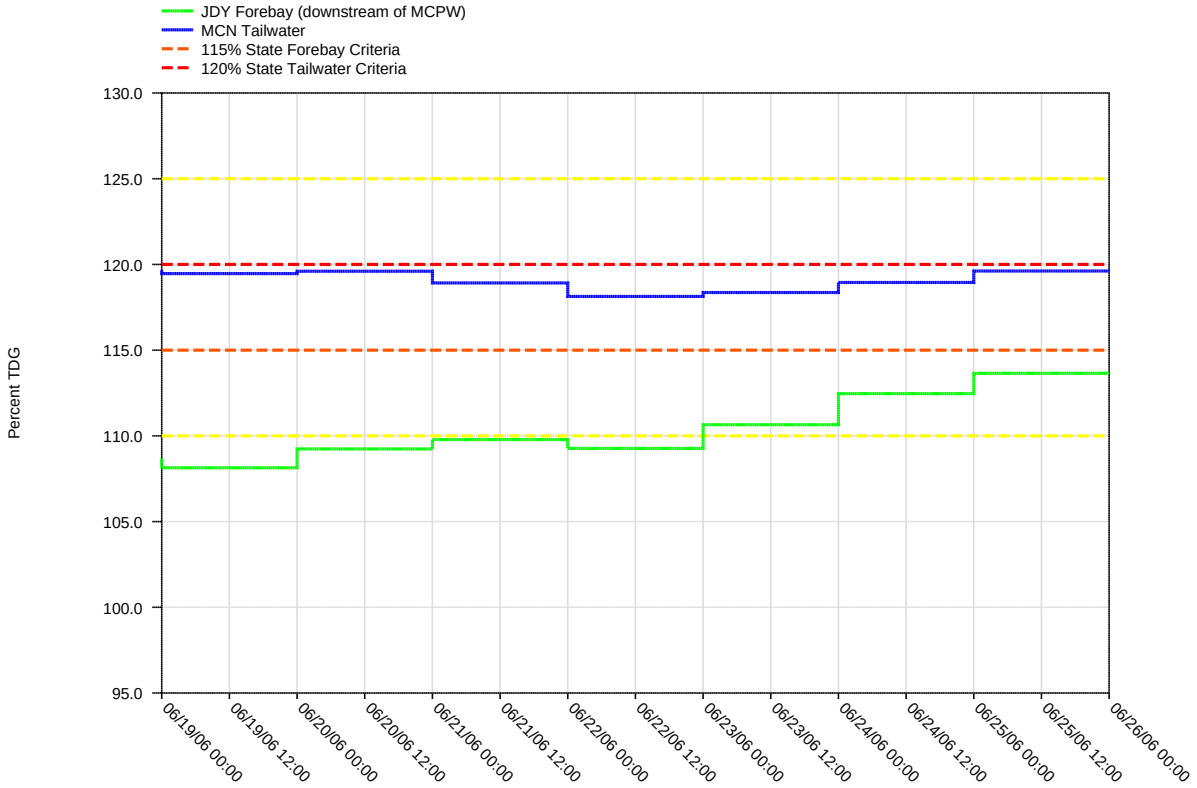
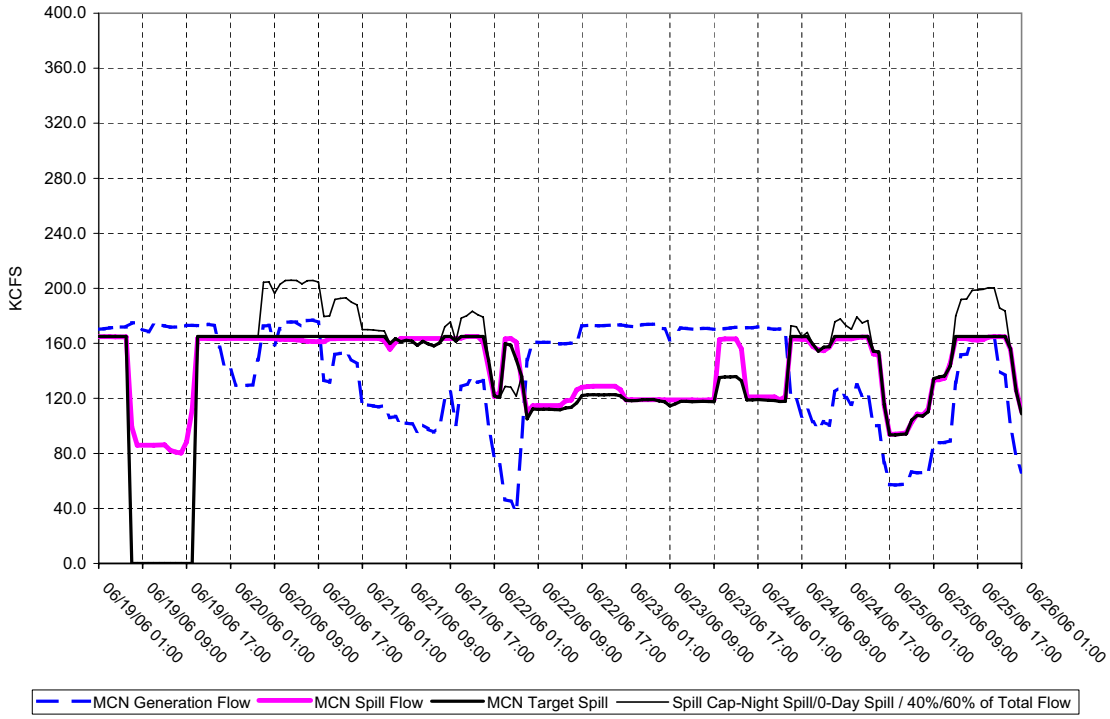


Figure 29.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



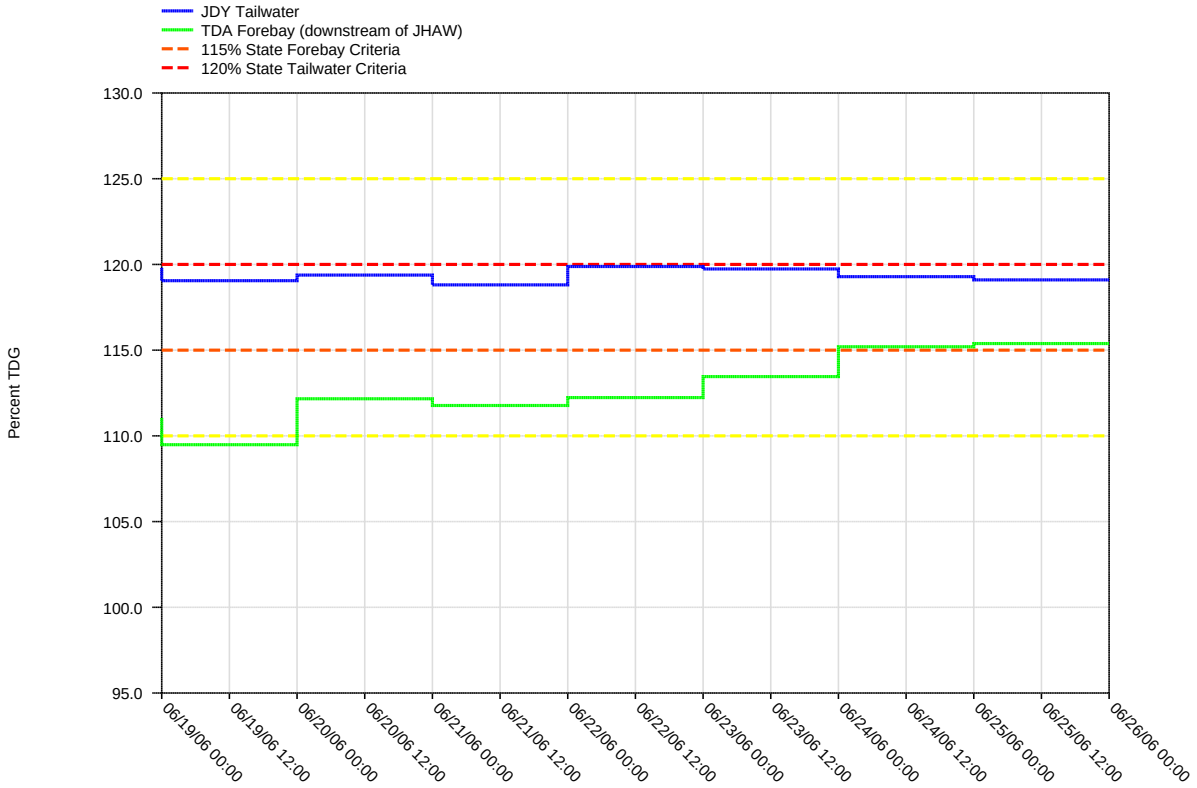
McNARY DAM - Hourly Spill and Flow



Summer Spill Began 20 June at 0600 Hours

Figure 30.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

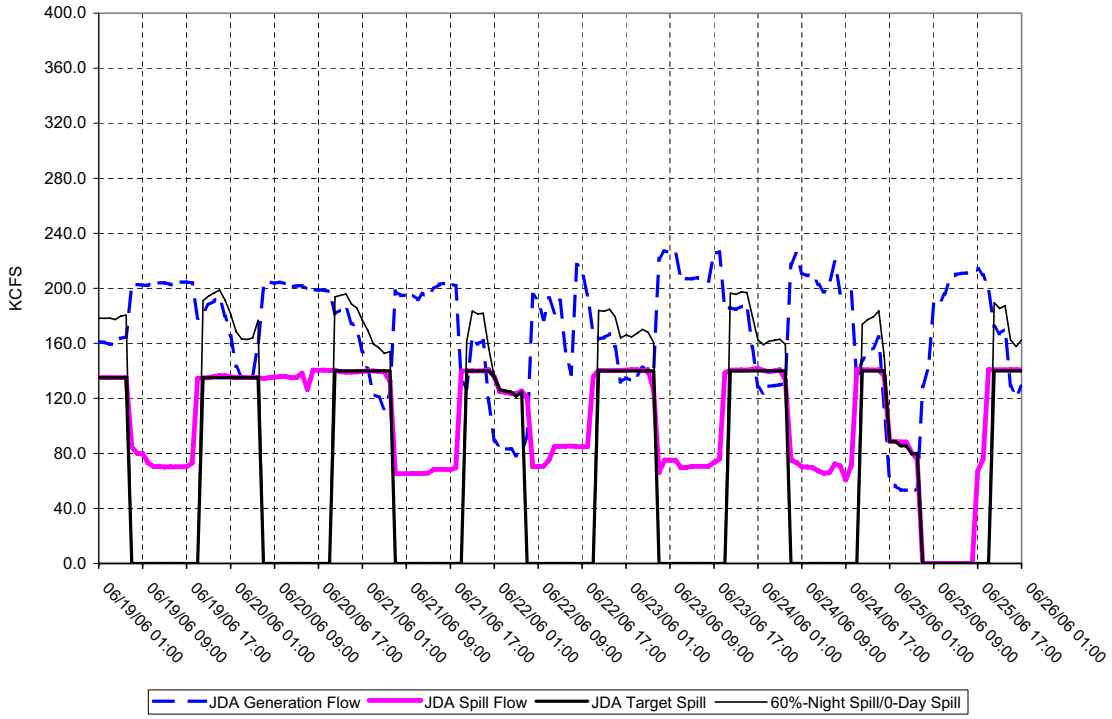
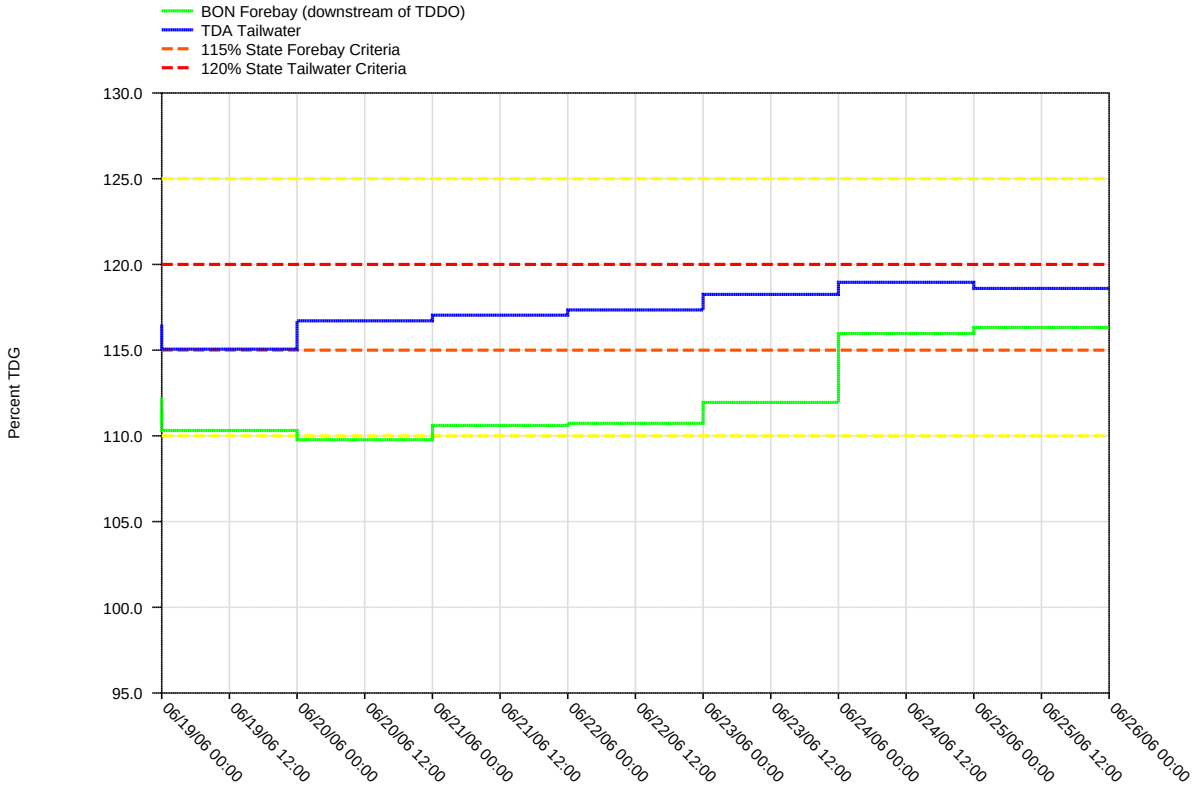


Figure 31.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

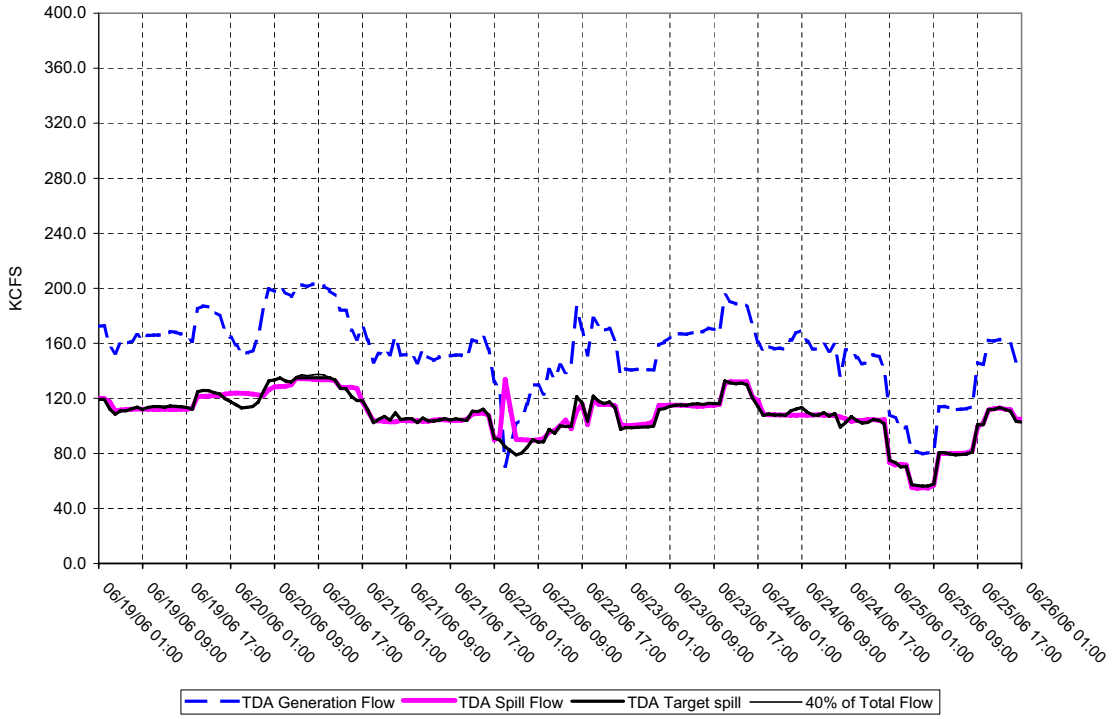
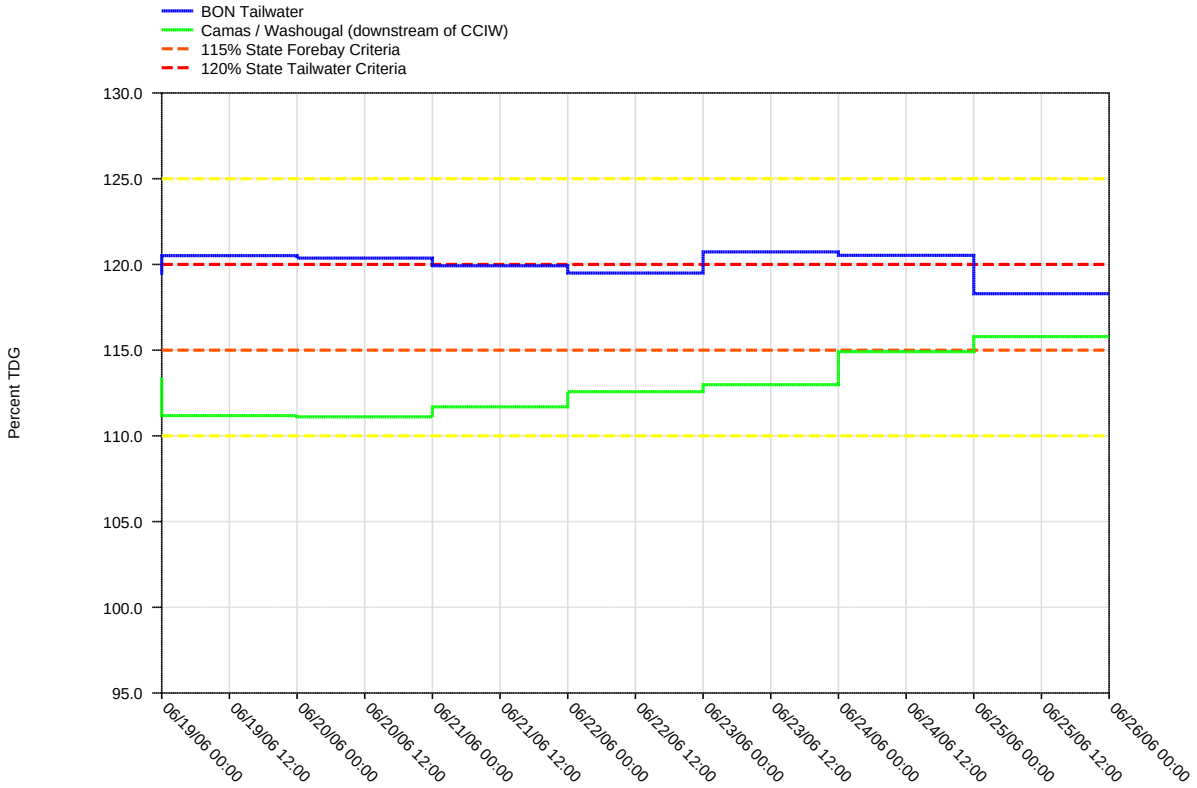
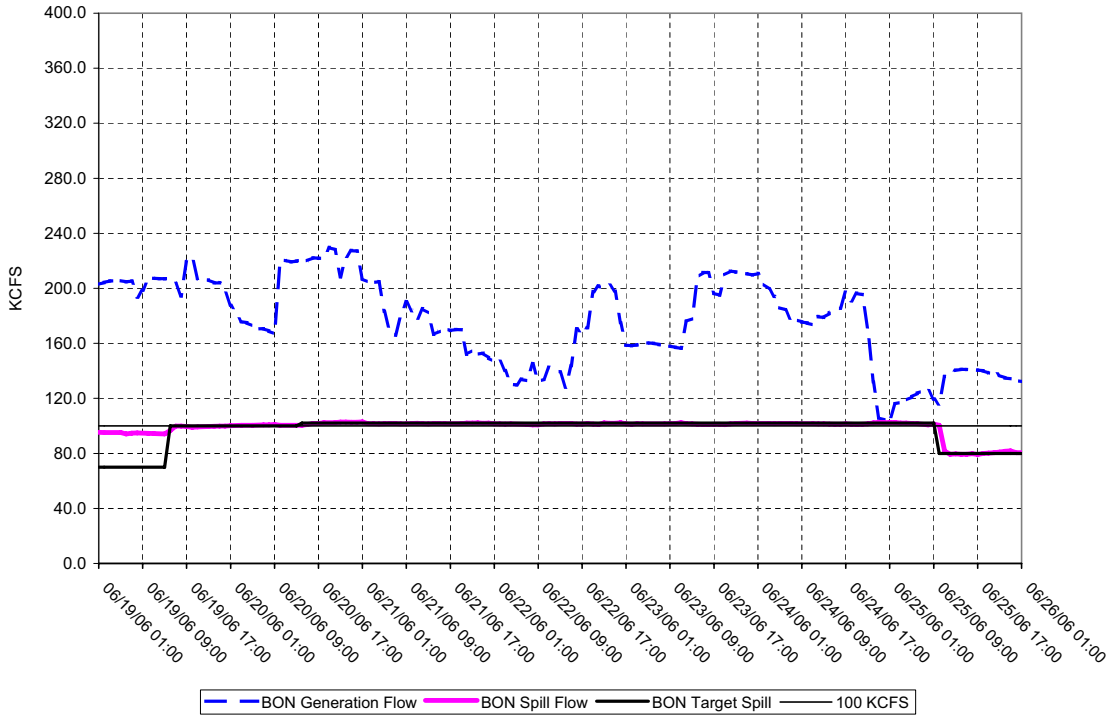


Figure 32.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



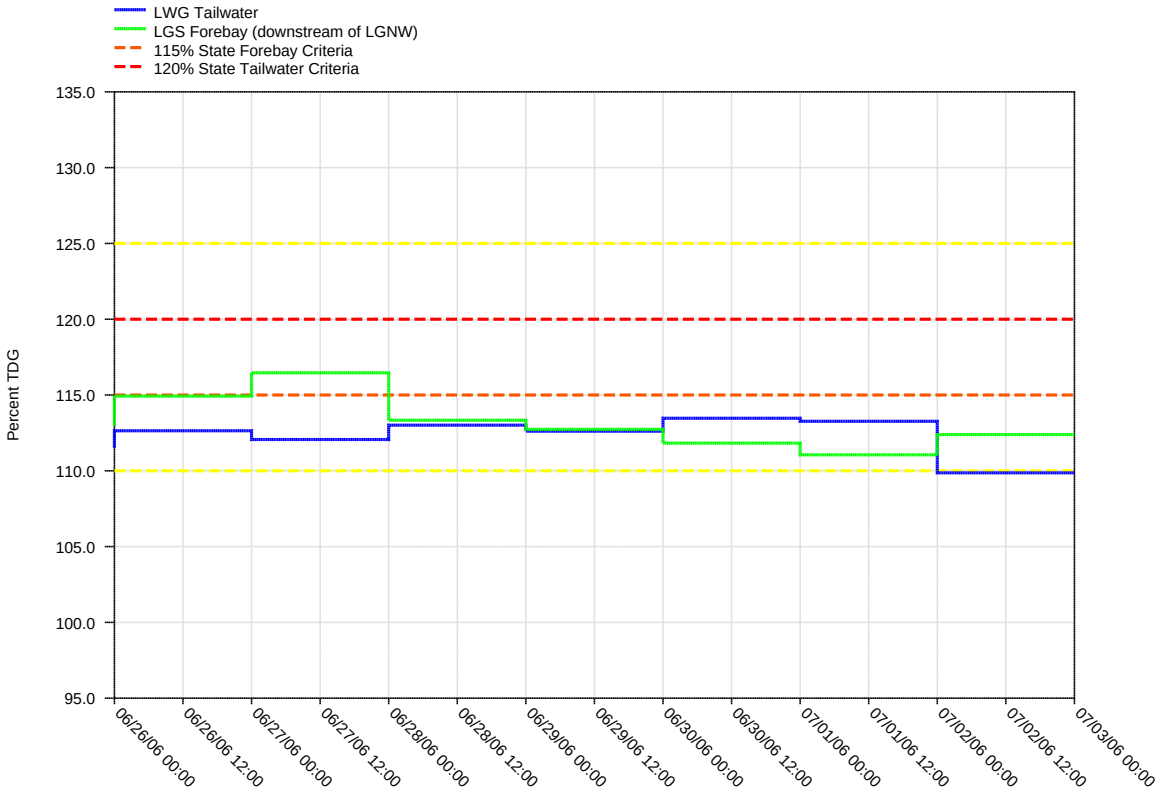
BONNEVILLE DAM - Hourly Spill and Flow



Summer Spill Began 21 June at 0001 Hours

Figure 33.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

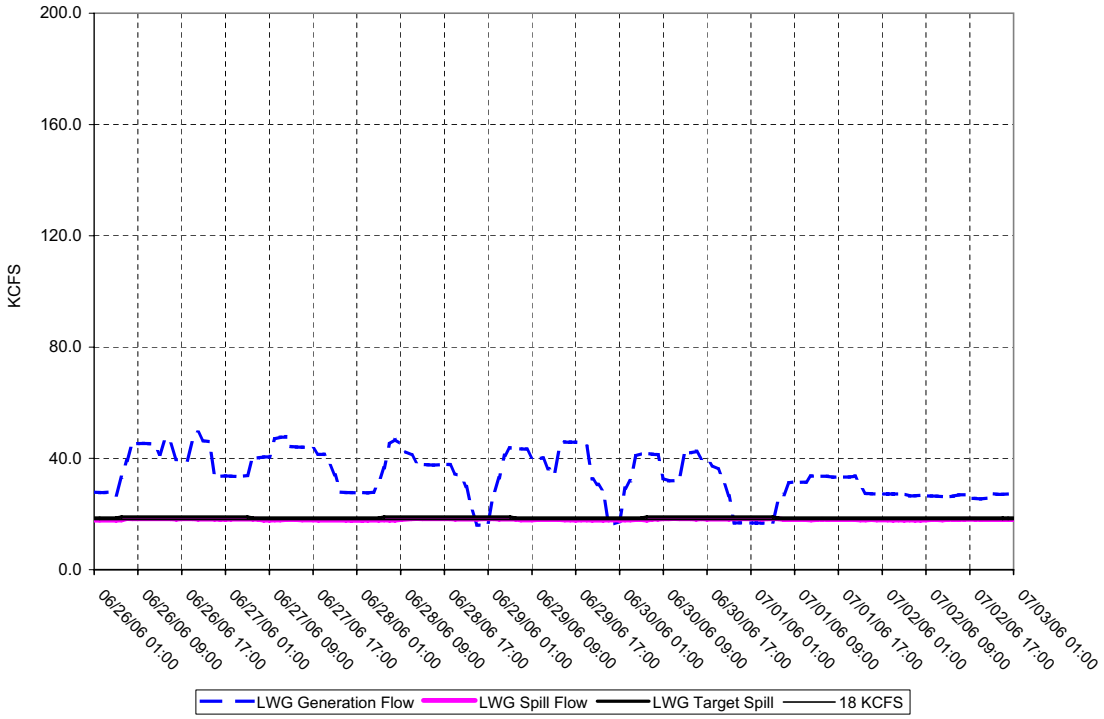
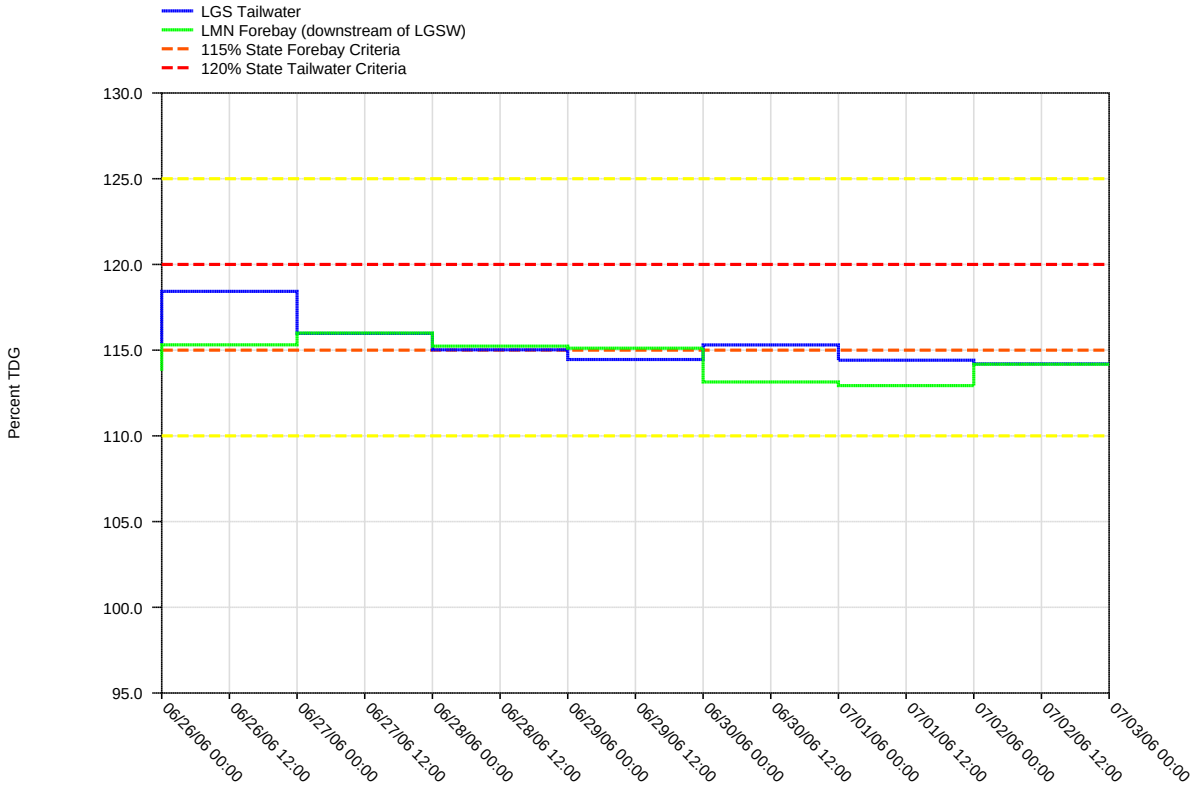


Figure 34.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

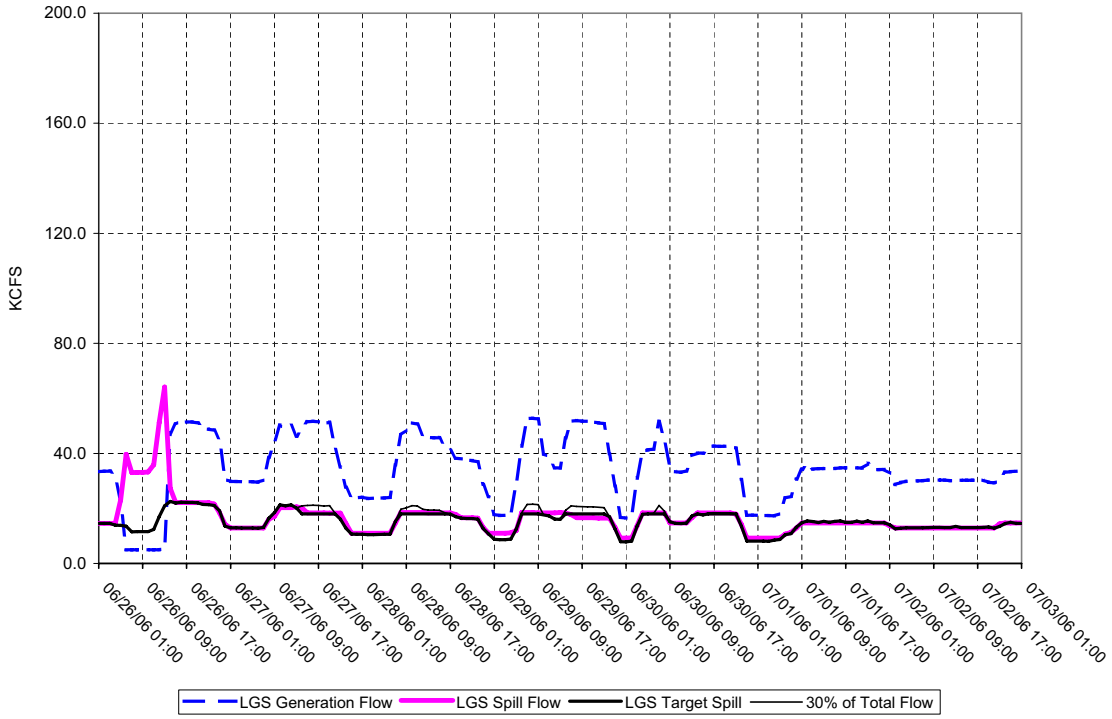
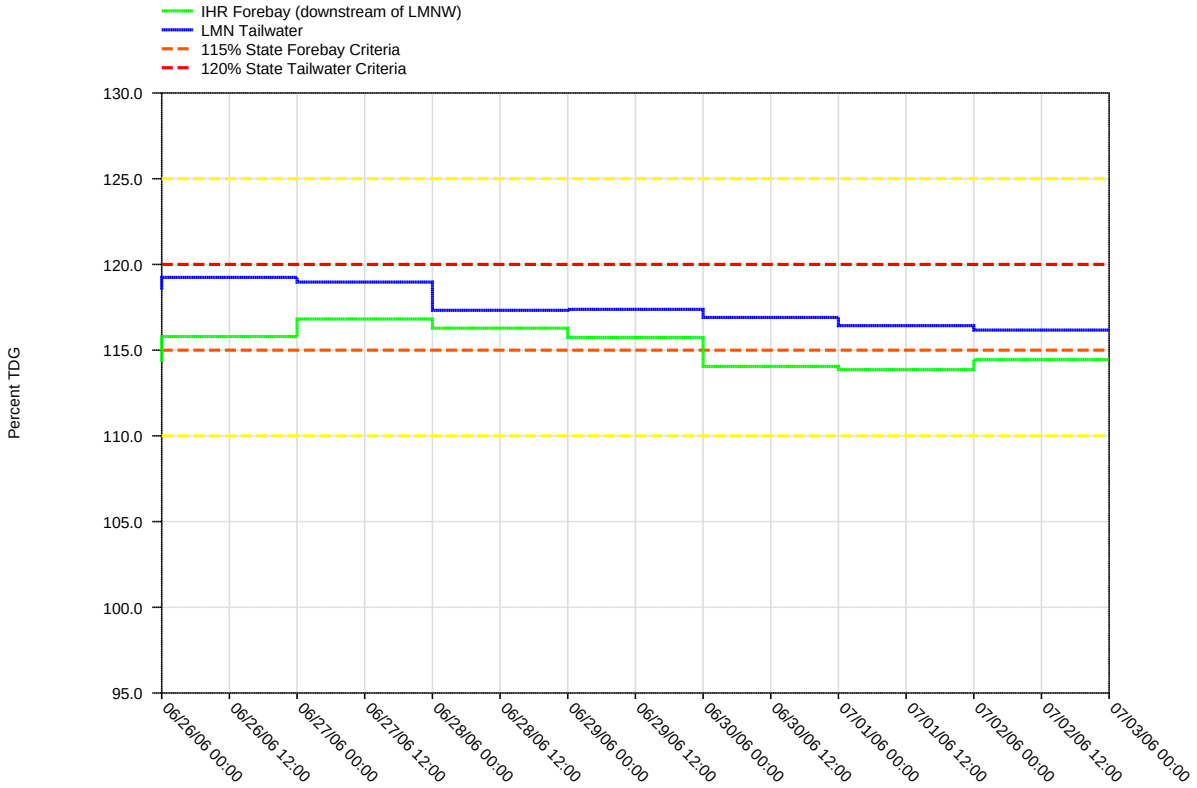


Figure 35.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

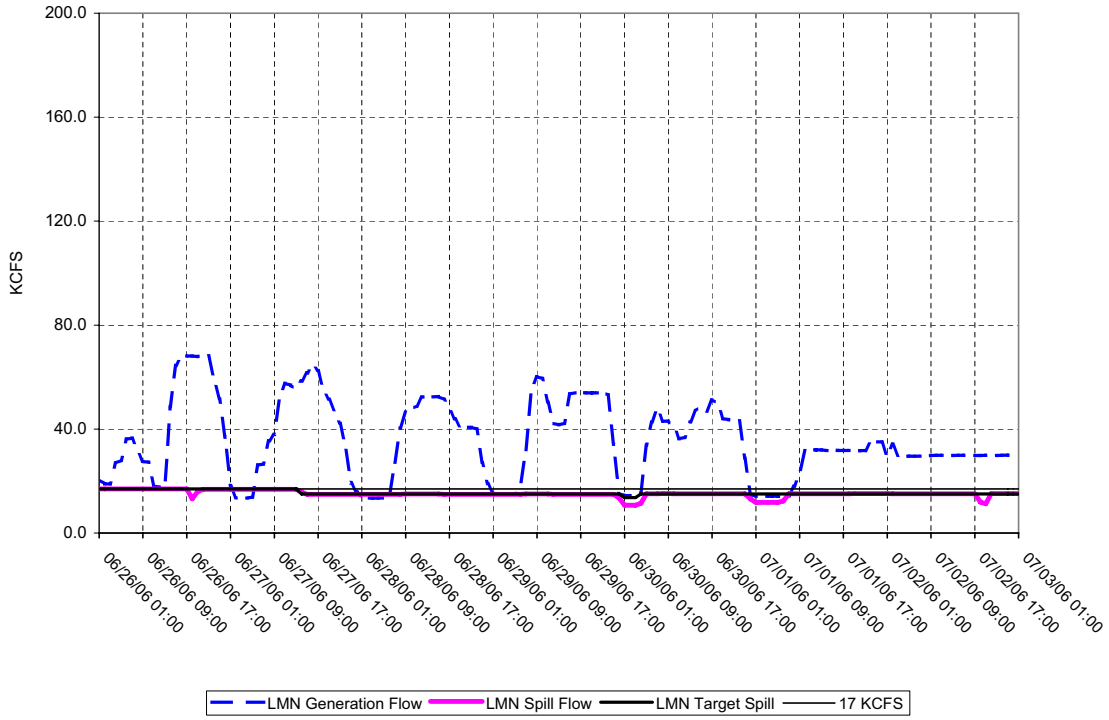
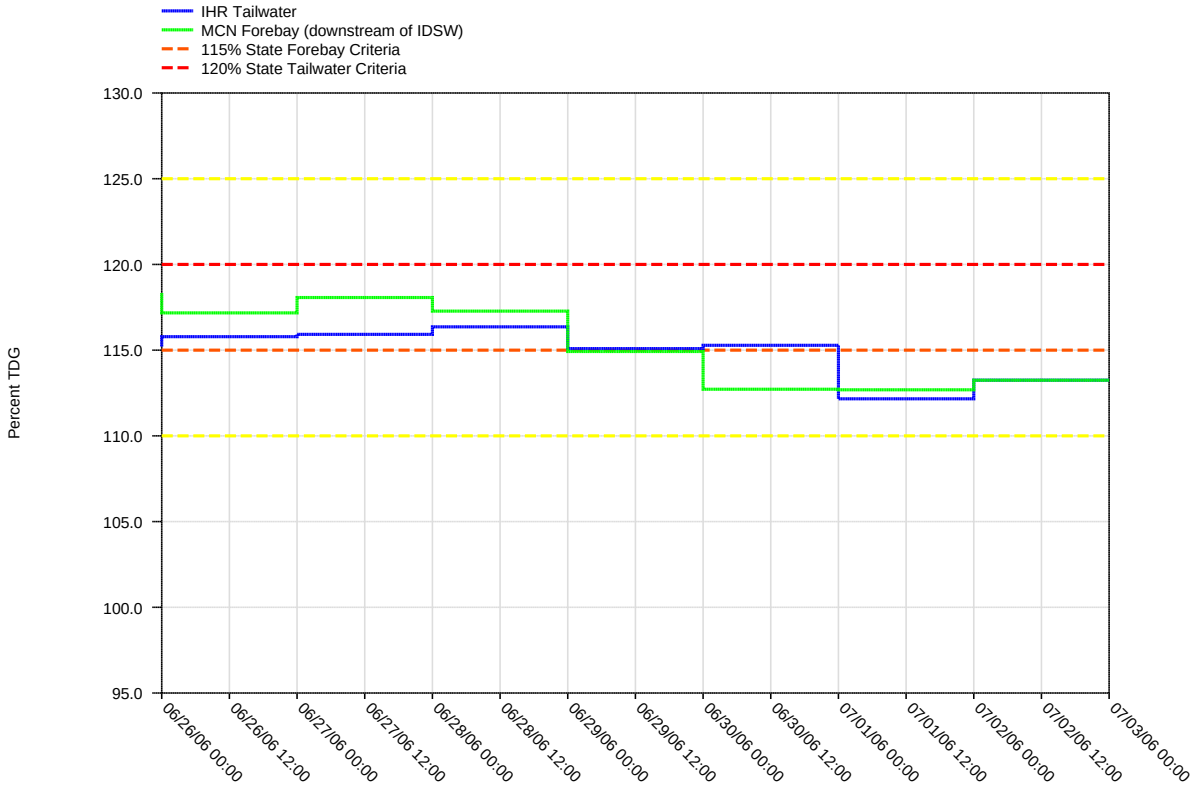


Figure 36.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

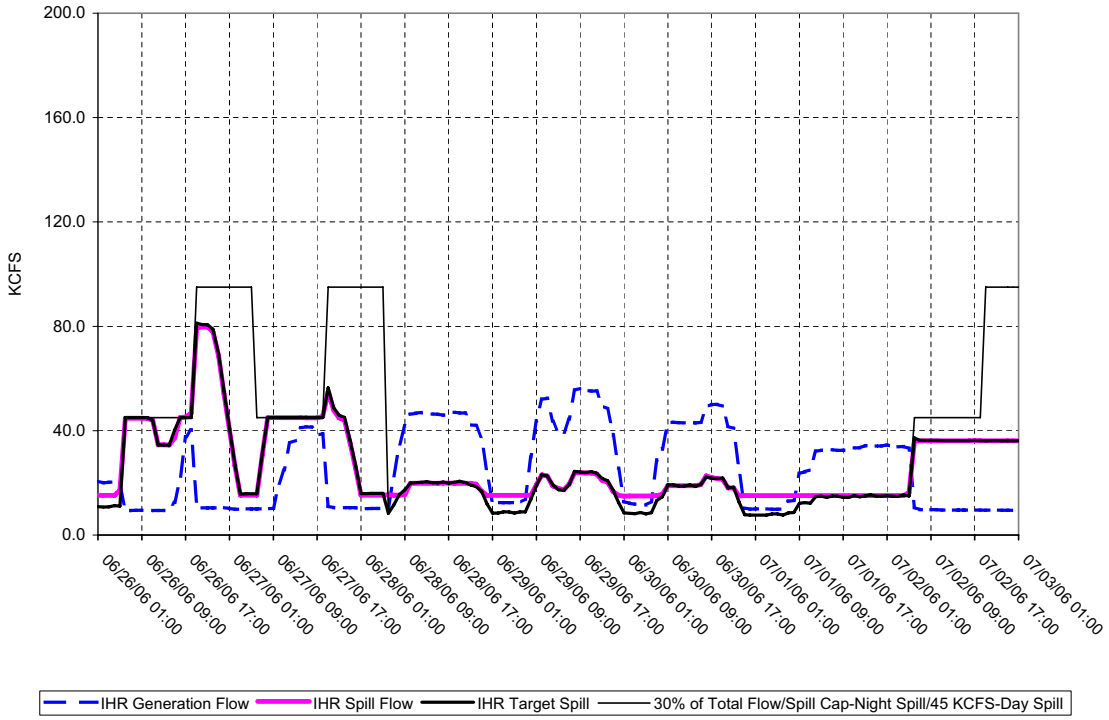
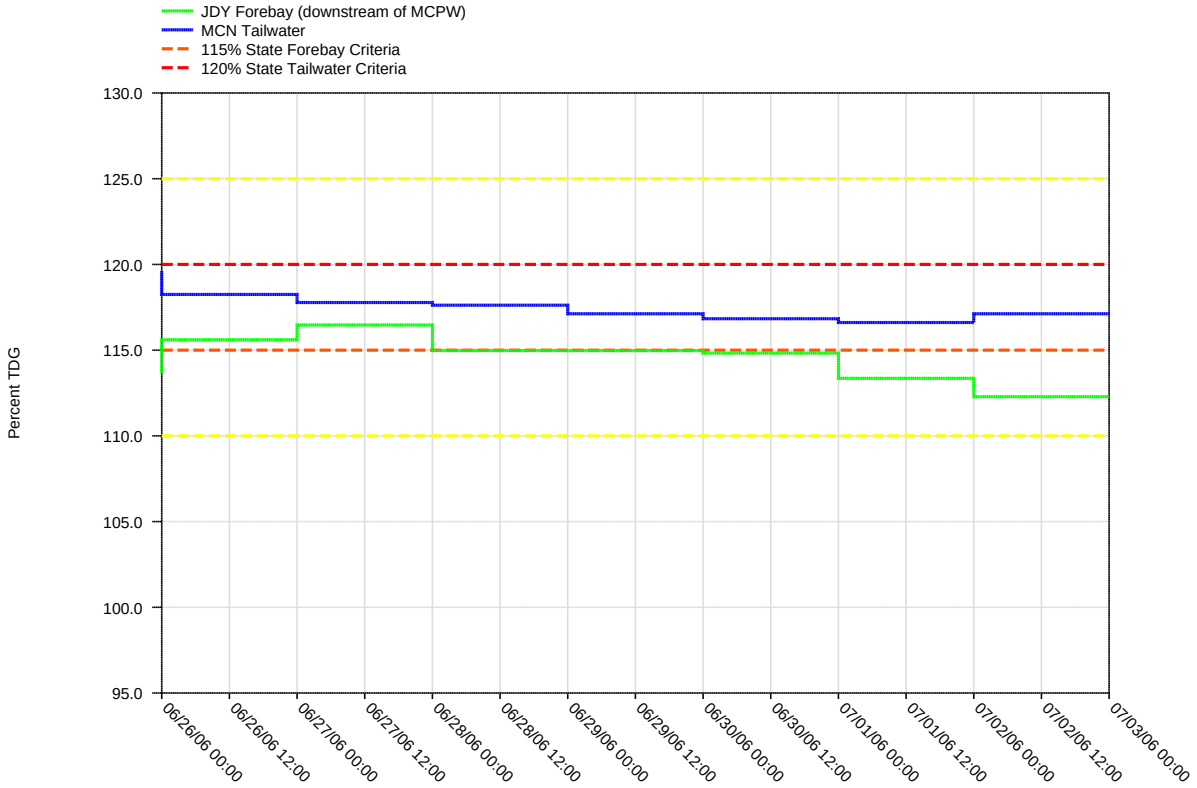


Figure 37.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

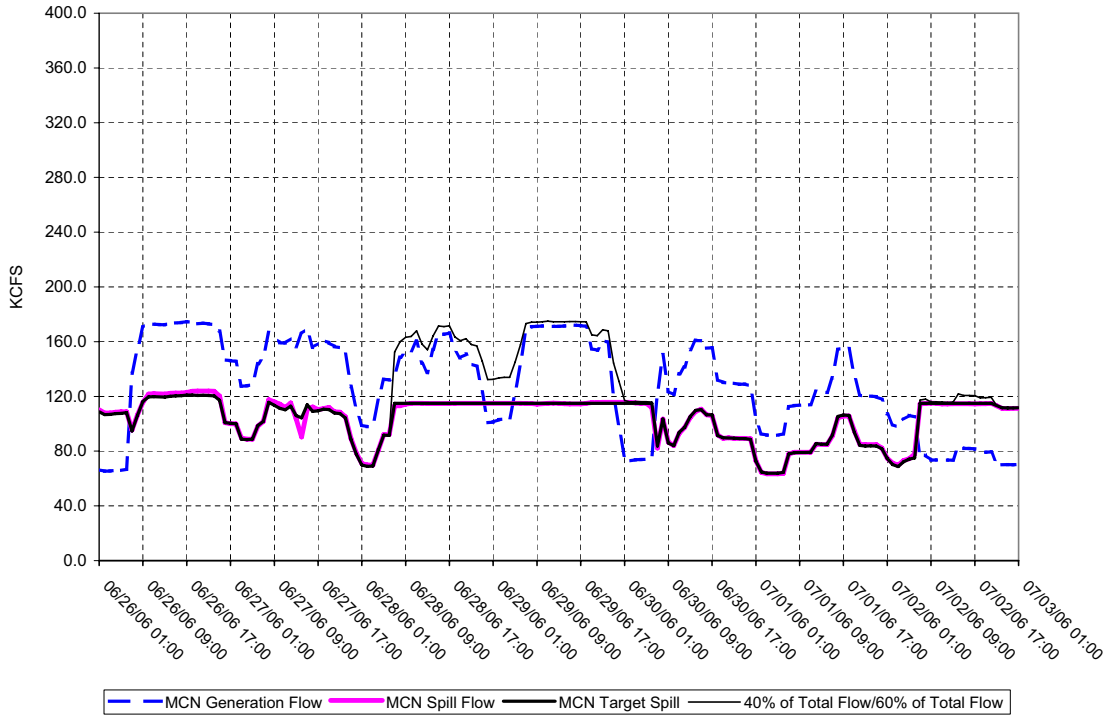
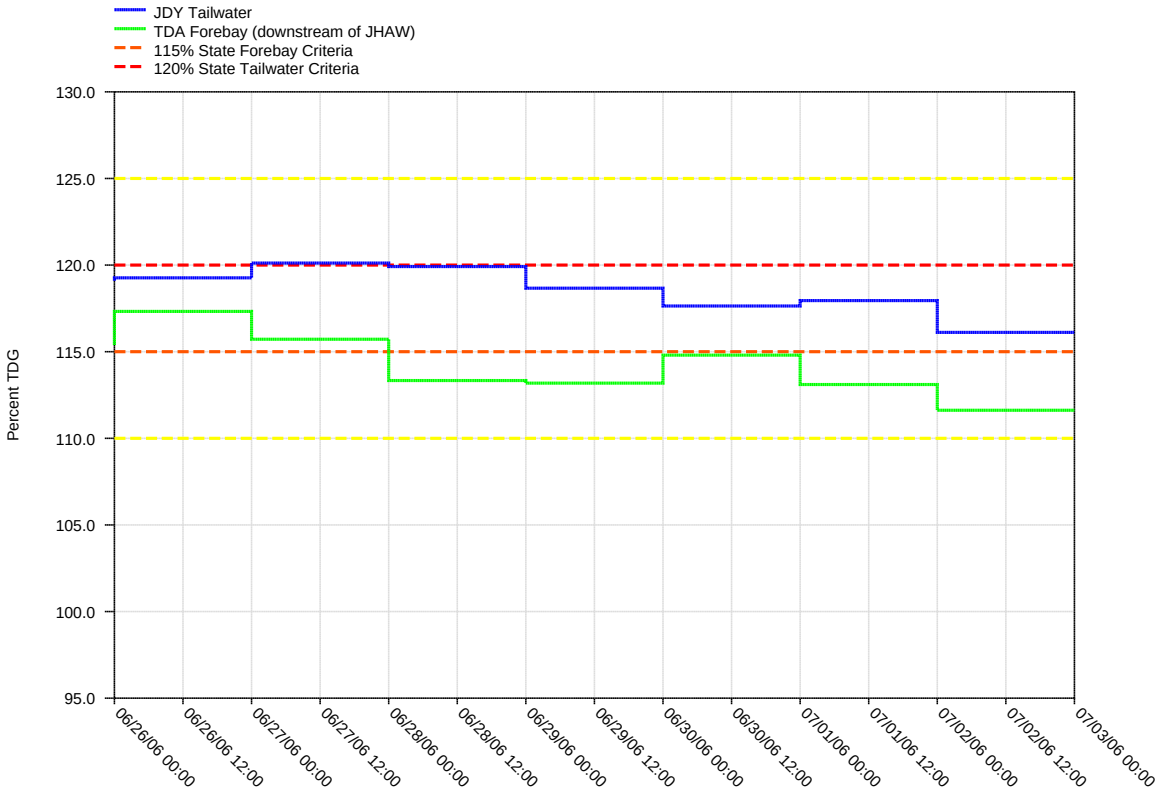
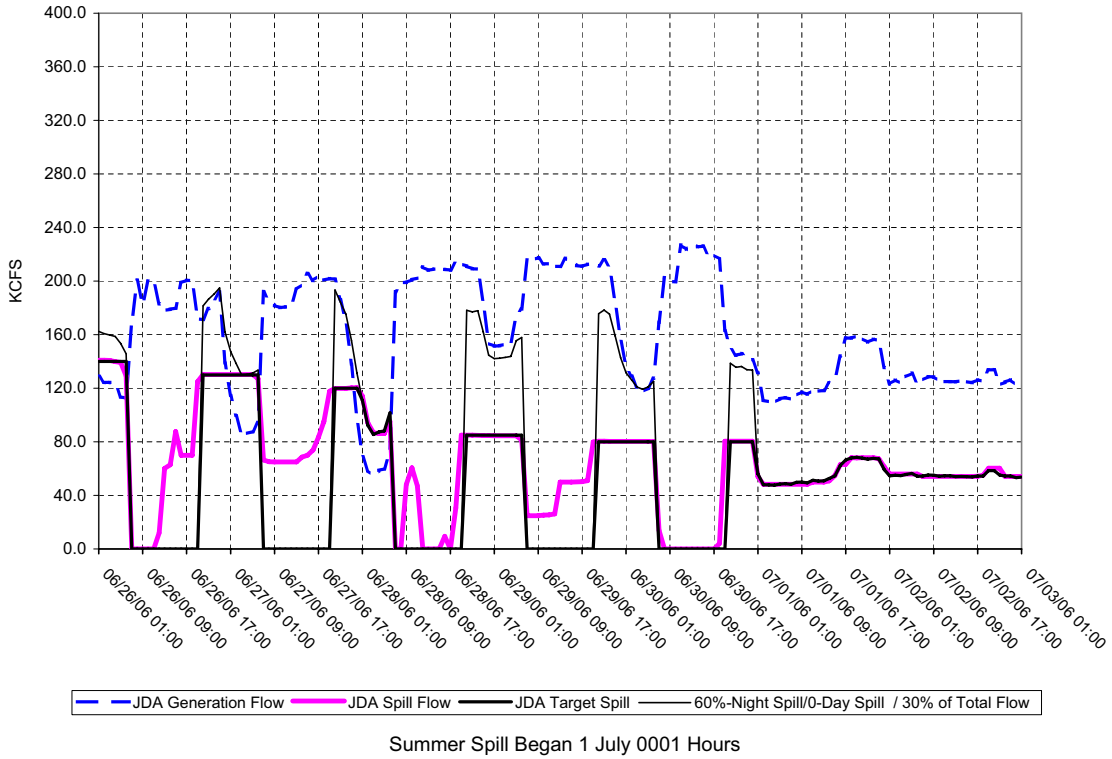


Figure 38.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



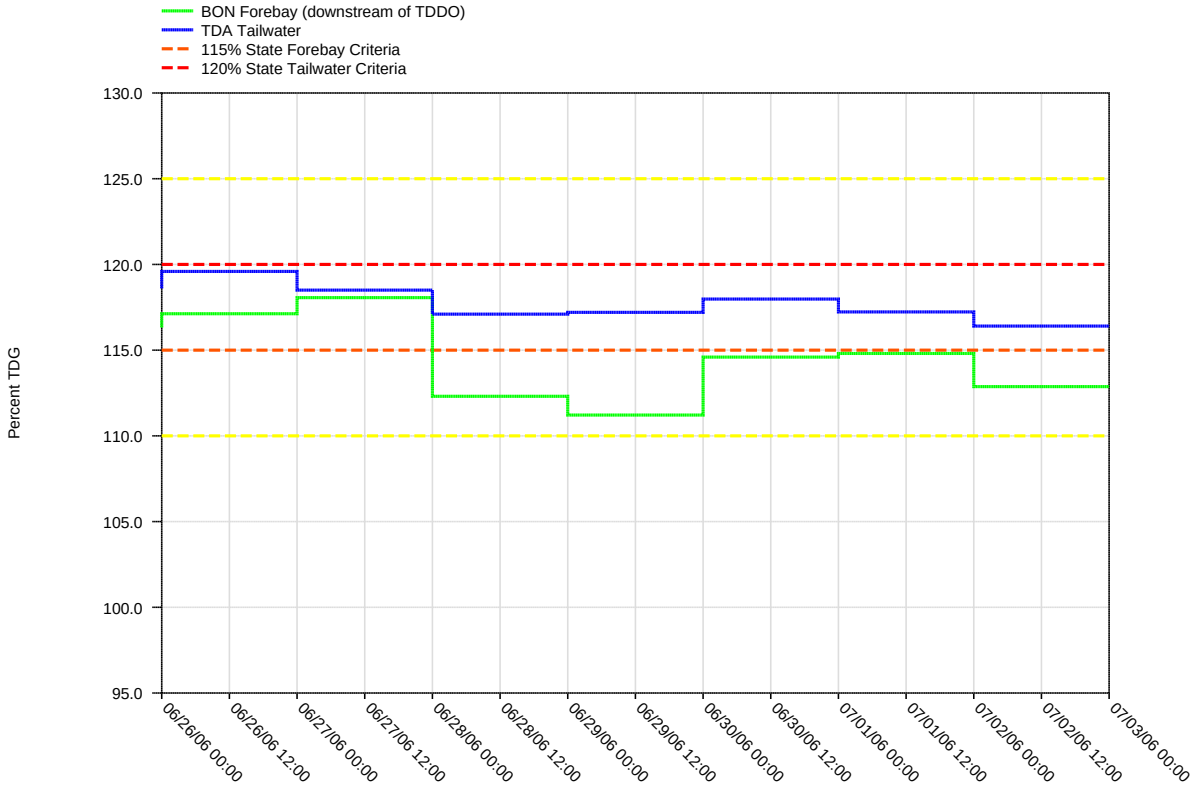
JOHN DAY DAM - Hourly Spill and Flow



Summer Spill Began 1 July 0001 Hours

Figure 39.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

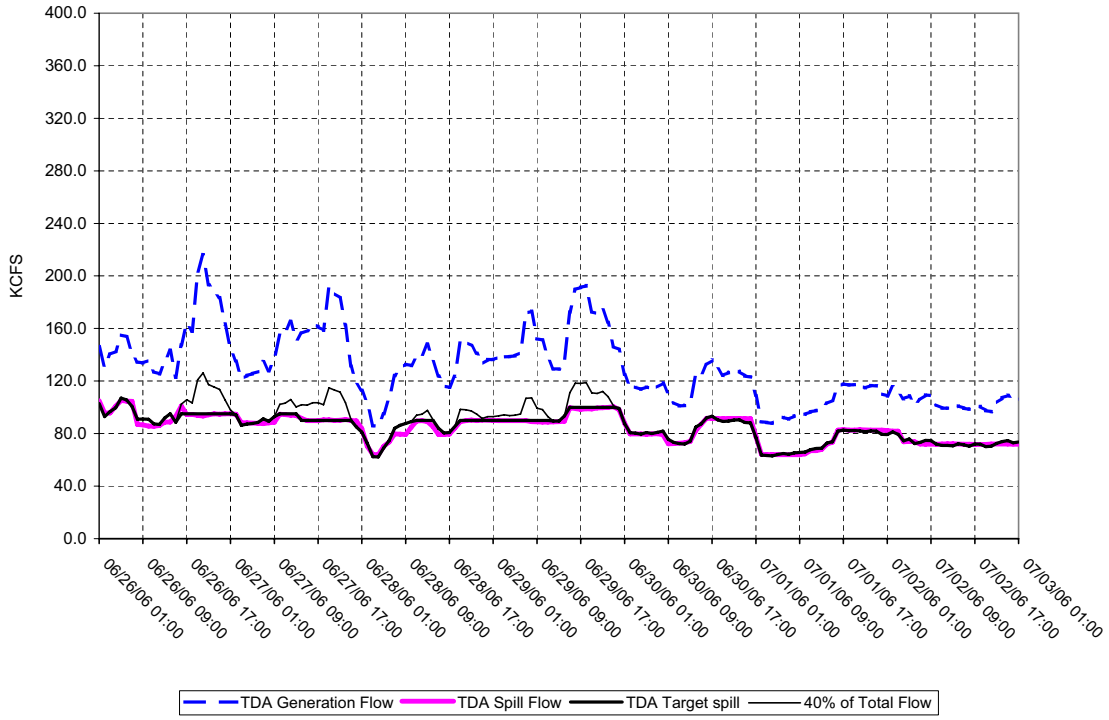
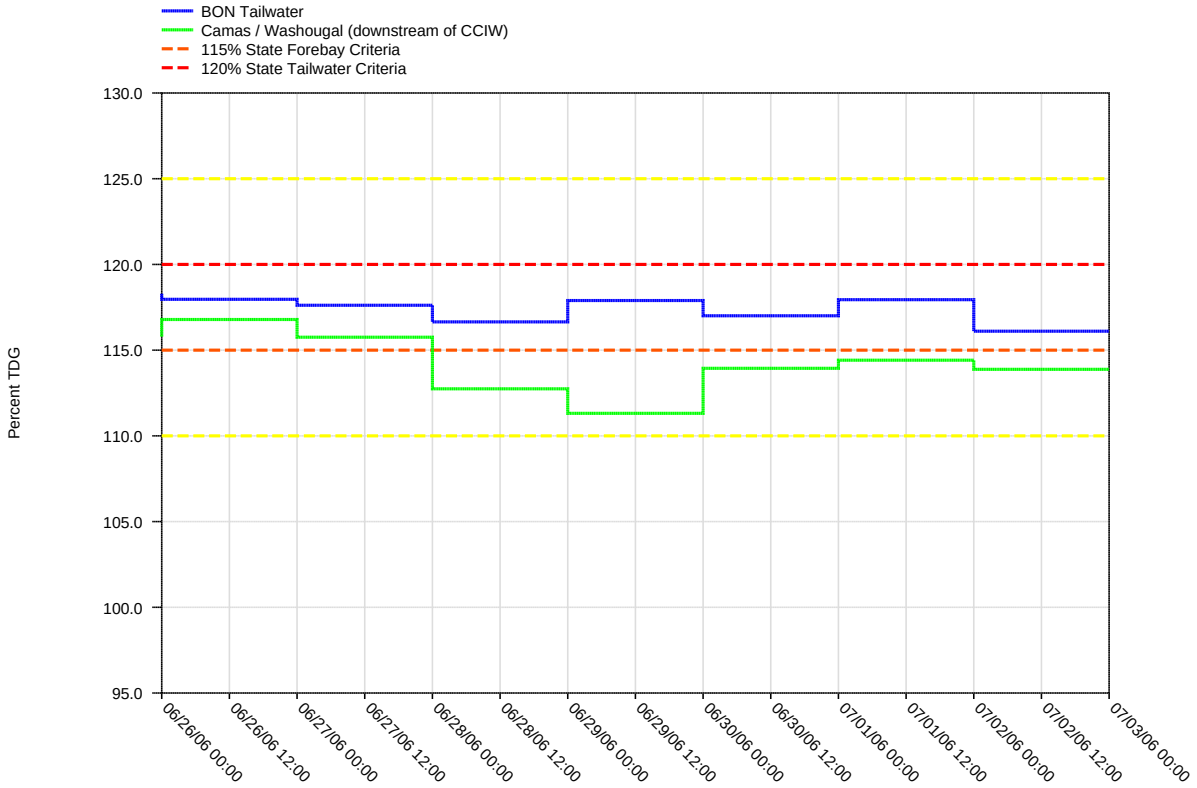
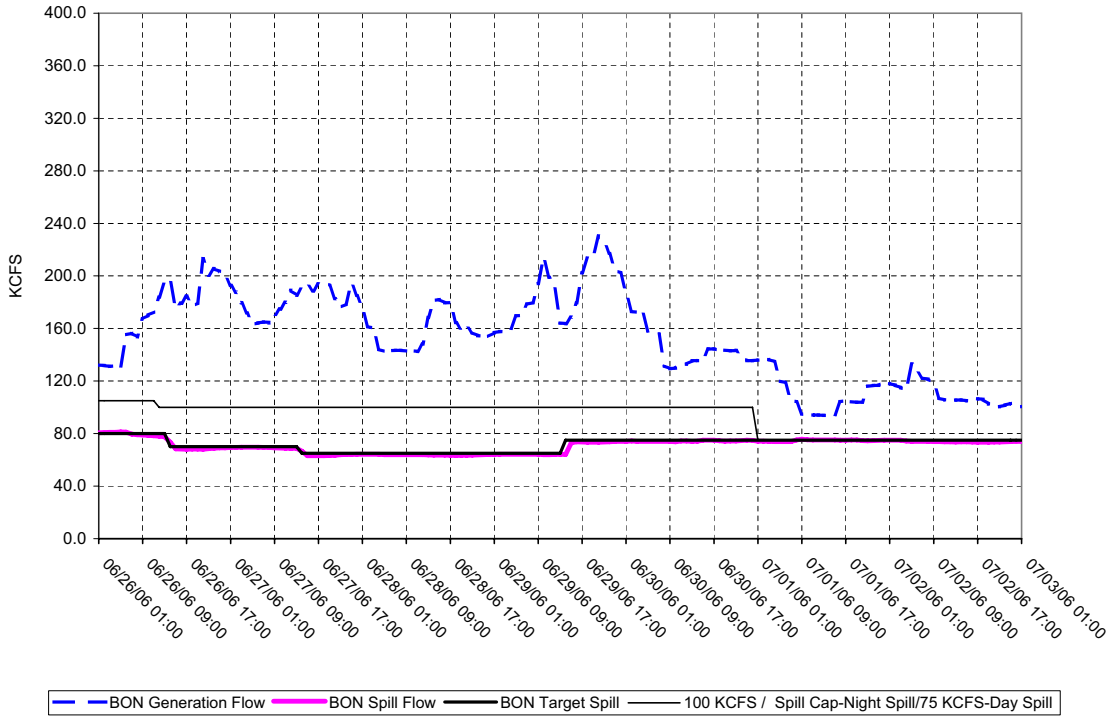


Figure 40.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow



Summer Spill Began 1 July 0001 Hours

Table 1.
Average percent TDG for 12 highest hours: May 29 – July 2, 2006

Date	Monitoring Stations (full list)																	
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	WRNO	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	120	115
05/29/2006	103.7	120.1	113.7	120.2	119.6	119.9	114.8	117.2	112.3	121.7	109.6	122.1	114.2	118.8	116.6	122.8	119.4	118.5
05/30/2006	104.4	119.3	113.4	122.5	119.7	121.2	116.4	118.3	115.8	122.4	111.1	122.8	116.2	120.2	118.7	123.3	121.0	119.9
05/31/2006	105.8	110.7	115.1	115.5	121.4	121.2	119.4	117.8	118.0	119.6	113.1	120.8	116.4	120.2	120.0	123.8	121.3	120.
06/01/2006	106.8	112.0	116.4	116.3	118.5	119.9	118.3	117.3	118.8	120.3	116.1	120.0	115.3	117.8	118.7	123.5	119.9	118.7
06/02/2006	106.0	110.8	112.9	114.6	116.0	119.6	118.1	116.8	117.8	119.2	117.6	119.5	116.0	118.4	115.8	120.0	116.4	116.9
06/03/2006	103.7	113.5	109.9	113.7	114.8	120.5	115.6	116.7	115.0	119.8	117.4	119.3	116.6	119.5	116.5	121.1	117.0	116.1
06/04/2006	104.1	116.7	110.0	113.6	114.0	119.1	116.1	117.7	115.4	119.8	117.3	118.6	116.3	119.5	118.6	119.6	118.1	116.3
06/05/2006	103.9	119.3	109.5	114.5	112.4	118.2	114.0	119.2	116.0	118.7	115.3	118.9	115.8	119.5	117.1	122.0	118.0	117.5
06/06/2006	104.7	120.0	113.2	120.6	113.3	119.6	114.5	120.4	118.0	120.5	115.4	121.1	117.1	120.2	117.8	123.3	119.0	117.8
06/07/2006	105.5	120.3	115.7	120.5	120.3	121.4	116.3	121.3	119.0	121.7	114.5	121.7	115.6	120.4	115.3	124.5	117.9	116.6
06/08/2006	104.8	120.3	114.5	116.7	118.7	120.7	116.7	119.8	116.3	121.4	113.2	120.9	112.6	118.2	113.3	124.1	116.9	114.4
06/09/2006	103.9	120.4	109.8	120.3	115.0	119.8	115.3	120.5	113.7	121.0	111.0	122.4	113.1	117.8	112.8	123.3	116.2	114.8
06/10/2006	104.1	123.7	---	124.6	120.2	122.1	115.9	120.6	115.7	121.7	110.8	121.4	115.5	119.1	115.3	124.8	117.8	115.8
06/11/2006	104.9	125.0	---	126.0	121.5	122.2	118.4	123.4	117.2	122.5	112.1	122.3	121.4	122.4	118.2	125.3	119.3	118.2
06/12/2006	105.0	119.6	---	121.5	127.8	122.8	120.8	119.5	118.1	121.1	115.0	120.2	116.2	120.1	120.9	124.1	120.7	118.3
06/13/2006	104.2	116.2	119.6	118.7	124.0	121.1	120.0	118.3	116.8	120.2	115.4	119.5	113.7	117.6	117.1	123.9	118.8	118.2
06/14/2006	103.4	119.4	117.8	121.4	117.3	119.9	119.9	118.6	115.0	120.6	115.7	119.9	113.9	117.2	113.0	123.8	116.4	115.0
06/15/2006	103.1	118.1	109.8	118.2	116.7	120.9	115.0	119.3	112.3	121.4	112.7	120.1	113.7	118.7	113.3	124.1	116.5	114.8
06/16/2006	102.9	114.1	109.5	117.6	115.8	119.0	114.5	117.8	113.6	120.7	110.2	119.5	112.7	117.5	115.1	121.6	117.1	115.5
06/17/2006	103.1	111.2	109.1	112.5	111.5	118.1	112.7	115.9	112.8	119.9	107.4	119.7	110.9	115.9	113.1	120.0	115.7	114.9
06/18/2006	104.2	111.7	109.4	113.8	111.6	118.4	112.4	115.9	115.0	119.7	108.7	119.8	111.0	116.5	112.3	119.4	114.3	113.4
06/19/2006	104.1	111.3	107.9	113.8	111.5	120.2	112.7	115.5	115.5	119.5	108.1	119.1	109.5	115.1	110.3	120.5	112.5	111.2
06/20/2006	103.5	110.1	107.7	113.7	111.4	120.4	112.5	115.4	113.8	119.6	109.2	119.4	112.2	116.7	109.8	120.4	112.4	111.1
06/21/2006	103.1	111.2	108.3	113.9	110.9	117.8	113.4	115.6	112.6	118.9	109.8	118.8	111.8	117.0	110.6	119.9	113.8	111.7
06/22/2006	102.9	111.2	109.3	115.9	112.0	118.0	114.6	115.8	113.7	118.1	109.3	119.9	112.2	117.3	110.7	119.5	115.0	112.6
06/23/2006	103.1	112.3	109.9	115.5	112.6	118.1	114.3	115.7	113.9	118.4	110.7	119.7	113.5	118.3	111.9	120.7	114.4	113.0
06/24/2006	102.9	112.7	112.4	115.2	113.4	118.5	113.9	114.8	117.3	118.9	112.5	119.3	115.2	119.0	116.0	120.5	116.5	114.9
06/25/2006	103.1	111.5	113.0	115.4	113.8	118.5	114.3	115.2	118.3	119.6	113.7	119.1	115.4	118.6	116.3	118.3	117.6	115.8
06/26/2006	104.1	112.6	114.9	118.4	115.3	119.2	115.8	115.8	117.2	118.2	115.6	119.3	117.3	119.6	117.1	118.0	117.2	116.8
06/27/2006	104.6	112.1	116.5	116.0	116.0	119.0	116.8	115.9	118.1	117.8	116.5	120.1	115.7	118.5	118.1	117.6	117.1	115.8
06/28/2006	104.4	113.0	113.3	115.0	115.2	117.3	116.3	116.4	117.3	117.6	115.0	119.9	113.3	117.1	112.3	116.6	113.5	112.7

Date	Monitoring Stations (full list)																	
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	WRNO	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	120	115
06/29/2006	105.0	112.6	112.7	114.5	**115.1**	117.4	**115.7**	115.1	114.9	117.1	115.0	**129.8**	113.2	117.2	111.2	117.9	112.9	111.3
06/30/2006	104.2	113.5	111.8	115.3	113.1	116.9	114.1	115.3	112.7	116.8	114.8	**130.5**	114.8	118.0	114.6	117.0	115.6	113.9
07/01/2006	103.1	113.3	111.1	114.4	112.9	116.4	113.9	112.2	112.7	116.6	113.4	117.9	113.1	117.2	114.8	117.9	116.3	114.4
07/02/2006	101.0	109.9	112.4	114.2	114.2	116.2	114.4	113.2	113.2	117.1	112.3	116.1	111.6	116.4	112.9	116.2	115.2	113.9

Number of hours of data reported in a given day

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Big, bold, red text denotes exceedances.
--- indicates No Data
Dates run from hour 1 to 24 (not 0 to 23).

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
WRNO	Bonneville Tailwater (Warrendale)
CWMW	Camas / Washougal

FISH PASSAGE IMPLEMENTATION PLAN REPORT
July 2006

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

In accordance with the Court's instructions in the December 29, 2005 Opinion and Order, the U.S. Army Corps of Engineers (Corps) is providing the monthly report as described in the Fish Passage Implementation Plan (FPIP) submitted to the Court on April 3, 2006. The Corps' lower Columbia and Snake River project and fish passage operations for the month of July 2006 identified in the Order are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant 12-hour average total dissolved gas (TDG) for the tailwater at each project and for the next project's forebay downstream.

This report also provides information on issues presented and unanticipated or emergency situations that arose during implementation of the spill program for the month of July 2006.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per week in July displaying the progress of the spill program as follows:

(A). Daily Average of the High 12 Hourly % Total Dissolved Gas (TDG) Values - described in the upper graph.
(B). Hourly Spill and Generation Flows – described in the lower graph.

The weekly graphs begin on July 3 and end on July 31 for the following Lower Snake and Lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville Dams.

Each figure represents one week of operation for a project. The graphs start on Monday 0100 hours through Monday 0100 hours for the following dates:

July 3 – July 10	Figures 1 - 8
July 10 – July 17	Figures 9 - 16
July 17 – July 24	Figures 17 - 24
July 24 – July 31	Figures 25 – 32

A. Upper Graph: Shows the resultant daily average percent TDG for the 12 highest hours as the result of spill from the dam. The objective is to operate each project up to the TDG limits without exceeding those limits if possible.

- The blue line on the graph represents the TDG in the tailrace of the dam. 120% TDG is the upper operating limit.
- The green line represents the TDG in the forebay of the next dam downstream. 115% is the upper operating limit.

B. Lower Graph: Represents the flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The heavy red line represents the hourly flow through the spillway in kcfs.
- The thin black line represents the project spill levels shown in the spring and summer spill tables in the 2006 FPIP (pages 1 – 2).
- Each graph includes a heavy black line that represents the target spill. This is the hourly spill level as defined in the 2006 FPIP. This maximum spill level is subject to the following conditions:
    - Spill percentage or discharge specified in the FPIP;
    - Spill caps as set daily for TDG management;
    - Test spill levels for fish passage research; and,
    - Minimum generation for power system needs.

  The hourly target spill may vary as a function of quantity of river flow and generating units available at a project.

II. A monthly table (Table 1) is included at the end of the report that shows the overall daily results of the average percent TDG for the 12 highest hours for all projects. The numbers in red show exceedances of the TDG gas cap - 115% (forebay) or 120% (tailwater) for each project.

Operations:

During the July reporting period, the projects provided summer spill and fish passage operations in accordance with the FPIP and its procedures. McNary Dam continued its summer spill test by spilling 40% for two days and 60% for two days, on an alternating basis. Transported juvenile fish were barged every other day in July at Lower Granite, Little Goose, Lower Monumental, and McNary dams.

Inflows in July receded naturally across the Columbia Basin. Brief periods when the spill was below the level described in the FPIP can be seen on the graphs where the heavy red line dips below the heavy black line. When the operation varied below the target spill, or other alterations occurred, explanations are included in the table at the end of this section (page 5).

As flows receded across the Columbia Basin, involuntary spill was significantly reduced at the projects. Due to low flows, the target spill was lowered, in accordance with the FPIP,

at Ice Harbor and Bonneville dams in order to meet minimum generation needs. The following projects experienced several hours of involuntary spill due to a drop in generation and operating within the 1% peak efficiency range as described in the 2004 BiOp: July 5th - Little Goose Dam; July 7th Little Goose, McNary, John Day, The Dalles, and Bonneville dams.

The following describes the July summer spill operation at each project: Lower Granite Dam spilled 18 kcfs and remained at that level throughout the month except for the last week of July when the spill cap dropped to 17 kcfs. This drop in spill was due to a mistaken instruction to the dam. On July 14, the project was instructed to begin implementation on July 18 a variation in the spill pattern based on findings from the spill test conducted in the spring. The instructions included a typographical error specifying a spill of 17 kcfs. This mistake was noticed on July 27th and corrected. At Little Goose Dam, 30% of the total flow was spilled. Lower Monumental Dam maintained its summer spill level of 17 kcfs or less, if needed to stay within TDG limits. Spill at Ice Harbor and Bonneville dams varied from daytime to nighttime as described in the FPIP and is shown as the heavy black line on the graph. At both dams the target spill fell below the spill cap on a number of occasions because of low flow conditions and the need to meet minimum generation requirements, *i.e.*, the amount of flow needed to keep one unit operating. This occurred several times at Ice Harbor Dam because there was not enough total flow in the river to provide minimum generation (9.5 kcfs) and 45 kcfs daytime spill, and spill to the spill cap (approximately 100 kcfs) at night. A similar condition occurred at Bonneville Dam from July 15 through July 21. The total flow in the river was not enough to provide minimum power generation at night plus the spill to the spill cap at night. At McNary Dam, the target spill alternated between 40% and 60% of total flow every two days, with the modification described in number 5 below. John Day Dam spilled 30% of total flow and The Dalles Dam spilled 40% of total flow with the exception of a few hours of involuntary spill due to lack of electrical load and system stability.

The following describes operational adjustments made through the Regional Forum process for July 2006:

1. Juvenile fish transportation operations at lower Snake River collector projects continued through July, with transport by barge occurring every other day, starting at Lower Granite Dam. Transport operations were carried out concurrent with spill at the projects, in accordance with the FPIP and criteria in the Fish Passage Plan (FPP). As described in the FPIP and the FPP transportation operations at McNary Dam began at 7:00 a.m. on July 6 as in-river migration conditions were no longer "spring-like" in terms of water temperature and flow. McNary water temperatures reached 62° F on June 25, and flows dropped below 220 kcfs on July 1. Technical Management Team (TMT) members agreed to the start date and time for McNary transportation at a TMT conference call on July 5.

2. Lower Granite Dam began the summer spill test at 0600 hours June 8, 2006 with spill treatments of 18.6 kcfs or 19 kcfs alternating daily. This test ended at 0559 hours July 18 and the project started spilling 18 kcfs 24 hours per day (hrs/day) using the spill pattern as specified in the 2006 FPP (except for the period July 21 to July 27 when the project spilled

17 kcfs, as explained above). The change in the summer schedule was due to the availability of fish and was coordinated through the TMT, Fish Passage Operation and Maintenance Coordination Team (FPOM) and the Fish Facility Design Review Work Group (FFDRWG). The summer treatment "4-stop" pattern spilling 18 kcfs 24 hrs/day was determined as the best pattern for fish passage by the region (TMT, Fish Passage Advisory Committee (FPAC), FPOM, and FFDRWG) and was implemented starting 1400 hours July 21.

3. Little Goose Dam began the summer spill test at 0600 hours June 20, spilling 30% up to the gas cap 24 hrs/day using two spill pattern treatments alternating every day as stated in the FPIP. This test ended at 0559 hours July 17 and started spilling 30% 24 hrs/day using the spill pattern as specified in the 2006 FPP. The summer treatment "bulk spill" pattern spilling 30 % up to the gas cap 24 hrs/day was determined to be the best pattern for fish passage by the region (TMT, FPAC, FPOM, FFDRWG) and was implemented starting 1400 hours July 21.

Lower Granite Dam personnel observed that the 14' minimum tailwater pool depth needed for safe barge passage was not being provided at all times in July because of low flow conditions. This was a safety issue and the Corps determined an increase in pool elevations of Little Goose to MOP + 1 foot was necessary. This modification was coordinated regionally through TMT and supported by NOAA Fisheries, U.S. Fish and Wildlife Service, Columbia River Inter-Tribal Fish Commission (CRITFC) and the States of Idaho and Oregon. Representatives from the States of Montana and Washington were not present on the TMT call, however were contacted after the meeting and did not object. The change in operation at Little Goose from the MOP to MOP+1 (operating range 634 - 635 feet) occurred on July 24 – 25. This operation was accomplished by reducing power generation flow through the powerhouse. The spill program as described in the FPIP was not impacted. It is expected that this operation will continue through the end of August.[1]

4. Ice Harbor Dam began this reporting period by continuing the research operation of spilling 30% up to the gas cap 24 hours/day vs. 45 kcfs during the day and spill to the gas cap at night, alternating treatments every two days. Both treatments had the Removable

[1] A similar operation was necessary at Ice Harbor Dam on August 4. On August 2, 2006 a barge grounded downstream of Lower Monumental Dam. To provide for safe navigation the Corps determined it was necessary to operate the Ice Harbor pool at MOP +1, between elevation 438 and 439 feet. The TMT had a conference call on August 3 to discuss and a change in operation was made to raise the pool elevation. This was accomplished by reducing power generation at Ice Harbor Dam to zero from midnight to 4:00 a.m. on August 4. The spill program was not impacted.

Because flows are continuing to recede, the Corps anticipates it will be necessary to implement the process described in the FPIP, which provides for making adjustments in spill in response to changes in flow conditions. The Corps will utilize the Regional Forum Technical Management Team (TMT) to coordinate necessary changes in operations.

Spillway Weir (RSW) operating. Ice Harbor Dam ended this study and started spilling for fish passage at 0500 hrs on July 20, using the spill pattern specified in the FPP.

5. The 2006 FPIP describes summer spill operations at McNary Dam during the July 1 – August 31 period specifying 24 hour spill at McNary, providing 40% of total river flow for 2 days followed by 60% for 2 days and continuing to alternate every 2 days through August 31. A biological evaluation of this spill operation was conducted at McNary Dam from June 20 until July 22. The test dates were coordinated previously through the Studies Review Work Group (SRWG).

As a result of very hot weather and high power demand, Bonneville Power Administration (BPA) participated in a TMT conference call held on July 24th and requested a minor modification of the spill operation at McNary Dam for several days. In accordance with the FPIP, spill at McNary Dam was 40% on Saturday and Sunday – July 22 and 23, and increased to 60 % on Monday July 24. BPA's requested modification on the July 24 TMT call was to spill 40% for the remainder of July 24 and 25, then increase to 60% for July 26, 27, 28 and 29. The planned alternating schedule would then resume as described in the FPIP. Therefore, for the week of July 22 through July 29, the same percentage of spill occurred.

This modification was coordinated regionally through TMT and supported by NOAA Fisheries, U.S. Fish and Wildlife Service, and the States of Idaho and Washington. Representatives from the State of Oregon and CRITFC were not present on the TMT call, however, they were contacted afterwards and did not object.

6. John Day Dam spill operations as a result of units 1 – 4 being out of service were discussed with the TMT and the FPOM. In response to System Operational Request (SOR) # 2006-3 dated April 4, the Corps agreed to closely monitor fish passage and hydraulic conditions, then if needed, address any observed problems through operational changes to assure efficient passage of migrating fish. John Day shifted to 30% spill 24 hours/day on July 1. Main units 1, 3, and 4 went back into service on July 19. The Corps continued to monitor conditions at the project to ensure that safe and efficient fish passage was maintained.

7. Libby and Hungry Horse summer operations: Consistent with the adaptive management provisions in the 2004 NOAA Fisheries BiOp and the 2004 Action Agencies' Updated Proposed Action (UPA), the State of Montana submitted SOR #2006-MT-1 to the TMT on May 31, 2006. The SOR requested modified summer drafts at Libby and Hungry Horse dams.

The 2004 UPA and BiOp provide for drafting Libby and Hungry Horse dams up to 20 feet during July and August to augment flows for salmon in the Columbia River. The SOR requested limiting drafts out of Libby and Hungry Horse dams to 10 feet extending to the end of September. The requested operation is in accordance with the Northwest Power and Conservation Council (NPCC) Fish and Wildlife Program Mainstem Amendments and was discussed in the Regional Forum committees on several occasions.

At a TMT meeting on July 12, NOAA Fisheries presented an alternate proposal to provide a 15 kcfs discharge from Libby through August, resulting in a draft of approximately 10 feet by the end of August, then shape September outflows to reach an elevation of 2439 feet by the end of September. Similarly, Hungry Horse Dam would operate to achieve a draft of about 10 feet by the end of August. Following this meeting, a technical group comprised of representatives from the Corps, NOAA Fisheries, Montana, Oregon, BPA, and CRITFC prepared a proposal to operate 3 units at Libby Dam with an output of approximately 15 kcfs, and a 3 kcfs operation at Hungry Horse, both through the end of August. Corps models projected a Libby reservoir draft between 10 and 15 feet by the end of August. In addition, due to the unusually high runoff this year, an agreement (Summer Storage Agreement) was reached between BPA and the British Columbia Hydro and Power Authority (BC Hydro) to store water in Canada during May and June to release in August and September.

The estimated flow reduction in August from the proposed operation at Libby and Hungry Horse was estimated to be between 35 ksfd and 280 ksfd. The Summer Storage Agreement will allow for a release of approximately 225 ksfd to 470 ksfd more water in August than will be reduced by the change in the Libby and Hungry Horse dam operation.

The proposal was discussed on an Implementation Team (IT) conference call on July 18, with the States of Montana, Washington, and Idaho, NOAA Fisheries and the Kootenai Tribe of Idaho supporting. The State of Oregon did not object and deferred to NOAA Fisheries and the Action Agencies. The U.S. Fish and Wildlife Service and CRITFC, representing the Warm Springs, Yakama, Nez Perce and Umatilla Tribes, stated that they would not object to the compromise. As a result of the regional coordination, the Corps and the Bureau of Reclamation decided to adopt the proposal and reduced Libby and Hungry Horse discharges beginning July 25. An accounting to demonstrate that flow from Libby and Hungry Horse dams, and Canadian storage has passed through the hydrosystem in August will be reported in the monthly spill report on September 8.

Variances from target spill and other anomalies in the graphs
July 2006 Spill Season

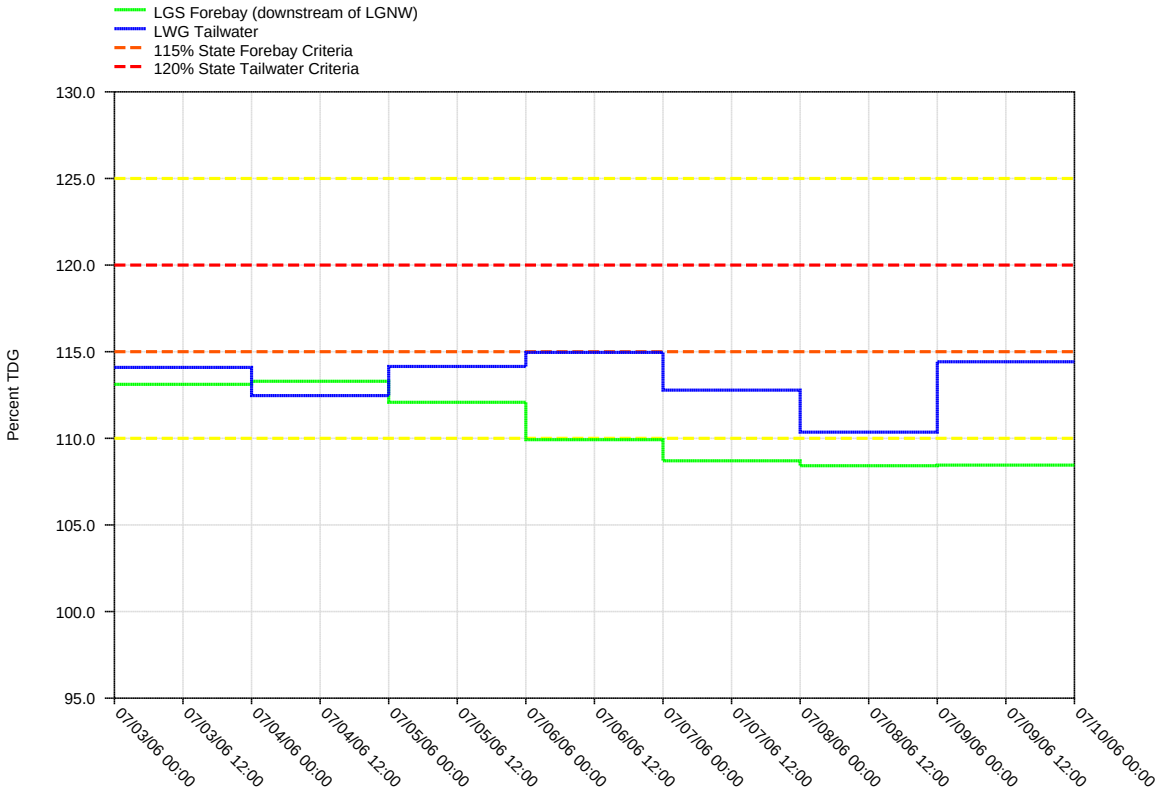
Project	Parameter	Date	Time	Reason
Bonneville	Spill	7/8/06	700	Spill was reduced for a tug boat to recover a body.
Bonneville	Spill	7/15/06 7/15/06 7/16/06 7/16/06 7/17/06	300 – 400 2300 200 – 400 2300-2400 100	Spill was reduced in order to maintain the Bonneville forebay elevation from going below established levels.
The Dalles	Spill	7/7/06	700 - 800	BPA sent the McNary spill quantity to The Dalles in error.
The Dalles	Spill	7/11/06	1000 - 1800	The Dalles was carrying reserves and control of the hydrosystem to ensure grid stability.

The Dalles	Spill	7/22/06	1600 & 1700	The project control room operator overlooked the specified spill change.
The Dalles	Spill	7/27/06	1000 & 1100	BPA overlooked sending out the spill change level to the project for that hour.
John Day	Spill	7/7/06	500 - 600	BPA sent The Dalles spill quantity to John Day in error.
John Day	Spill	7/11/06	1800	The dam operator's computer malfunctioned and valid data was not available during the hour. Project data showed spill of 74 kcfs, but this data was erroneous. The gates were not moved therefore spilling the incorrect amount.
John Day	Spill	7/22/06	1600 - 1700	BPA's automated generation control (AGC) calculated a low spill amount and BPA sent that spill amount to the dam before they realized there was an error.
McNary	Spill	7/4/06 7/706 7/9/06 7/11/06 7/13/06 7/15/06 7/17/06 7/19/06 7/21/06 7/23/06 7/25/06 7/27/06 7/29/06	700 700 & 1200 700 & 1200 700 & 1100 800 & 1200 700 & 1100 700 &1100 700 & 1000 600 – 900 700 & 1000 700 700 & 1100 700	Project reduced spill to allow safe movement of the fish barges in loading area.
Ice Harbor	Spill	7/6/06	1000 – 1800	BPA miscalculation of proper spill quantity for the outflow rate.
Ice Harbor	Spill	7/7/06	1000 - 1100	BPA overlooked sending out the spill change level to the project for that hour.
Ice Harbor	Spill	7/21/06 7/23/06	1000 - 1800 100 - 500	Spill was reduced in order to maintain Ice Harbor forebay elevation from going below established levels
Ice Harbor	Spill	7/26/06	1600 - 1700	Project finished annual maintenance of a unit and was testing its functionality
Lower Monumental	Spill	7/4/06 7/6/06 7/8/06 7/10/06 7/12/06 7/14/06 7/16/06 7/18/06 7/20/06 7/22/06 7/24/06 7/26/06 7/28/06 7/30/06	1800 – 1900 1900 – 2000 1800 – 1900 1800 1700 1500 – 1800 1800 1800 1800 – 1900 1900 1600 1800 1800 1800	Project reduced spill to allow safe movement of the fish barges in loading area.

Lower Monumental	Spill	7/13/06	2100 - 2200	Spill was reduced to help maintain grid stability.
Little Goose	Spill	7/24/06	1500 - 1800	Dam operator was occupied taking a generating unit off line, tagging and clearing for maintenance and overlooked change in spill.
Lower Granite	Spill	7/31/06	0000	Spill was reduced in order to maintain the Lower Granite forebay elevation from going below established levels.

Figure 1.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

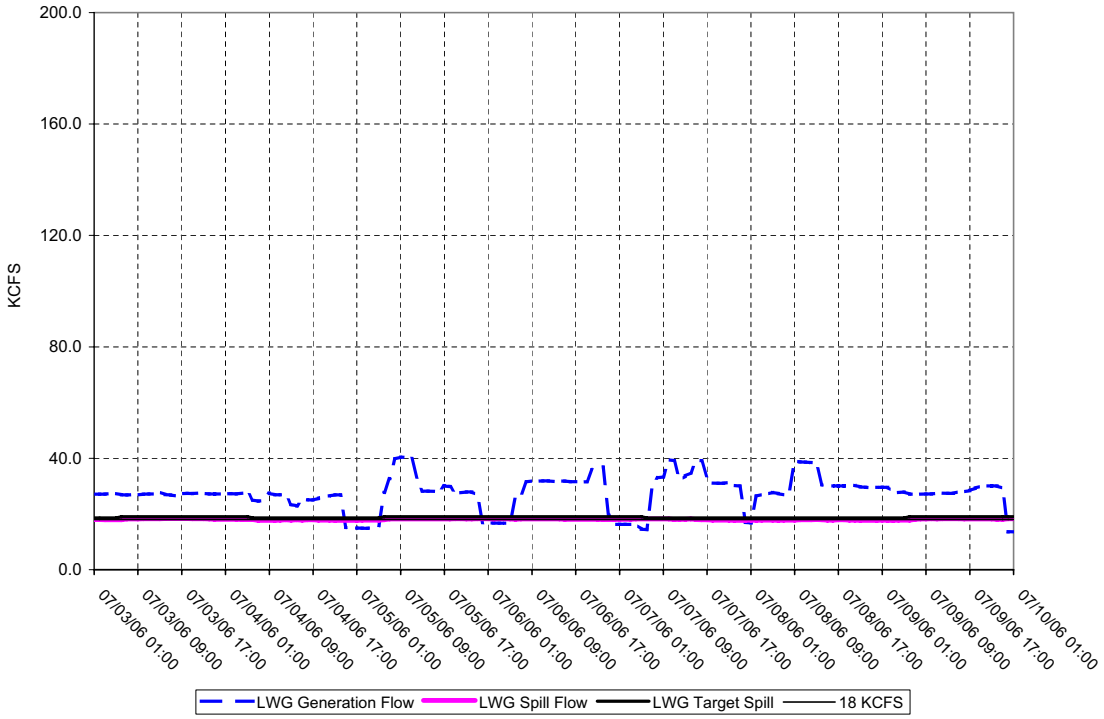
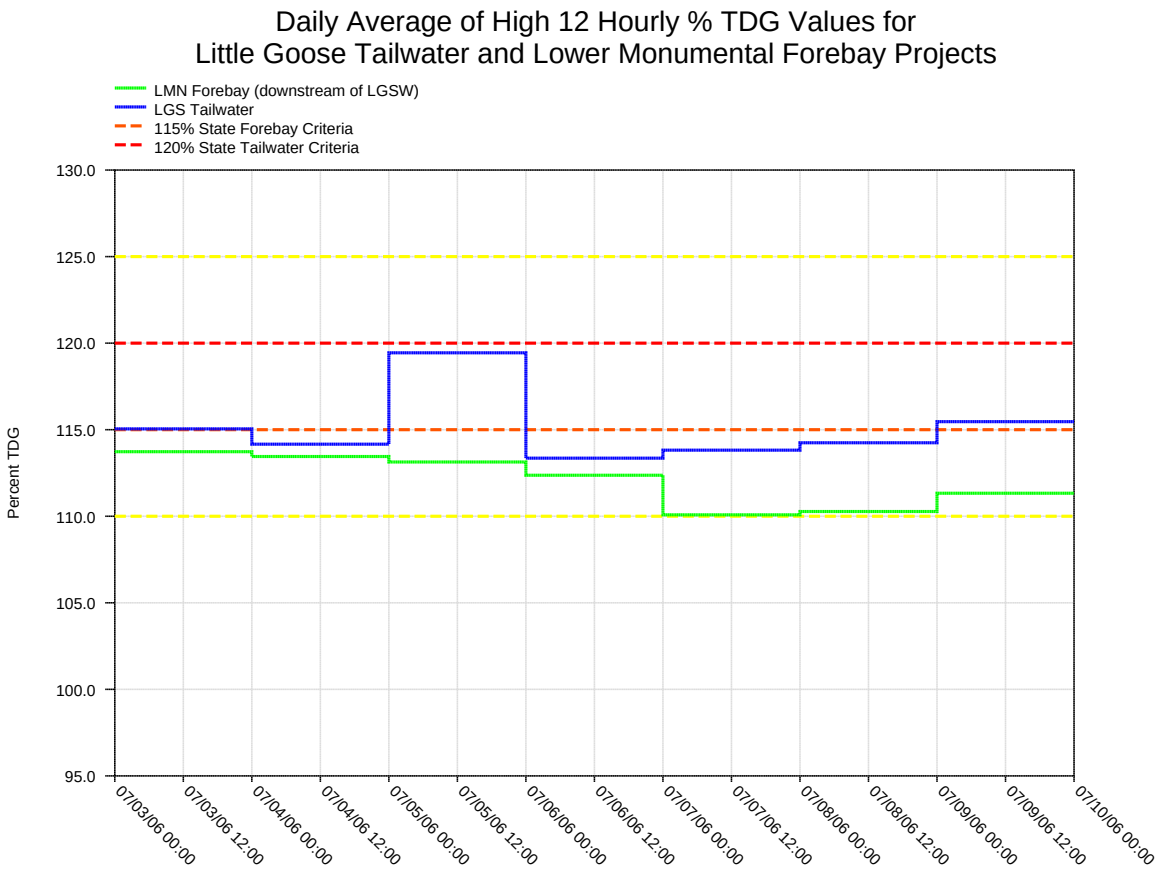


Figure 2.


Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects
LMN Forebay (downstream of LGSW)
LGS Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
07/03/06 00:00
07/03/06 12:00
07/04/06 00:00
07/04/06 12:00
07/05/06 00:00
07/05/06 12:00
07/06/06 00:00
07/06/06 12:00
07/07/06 00:00
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07/09/06 00:00
07/09/06 12:00
07/10/06 00:00

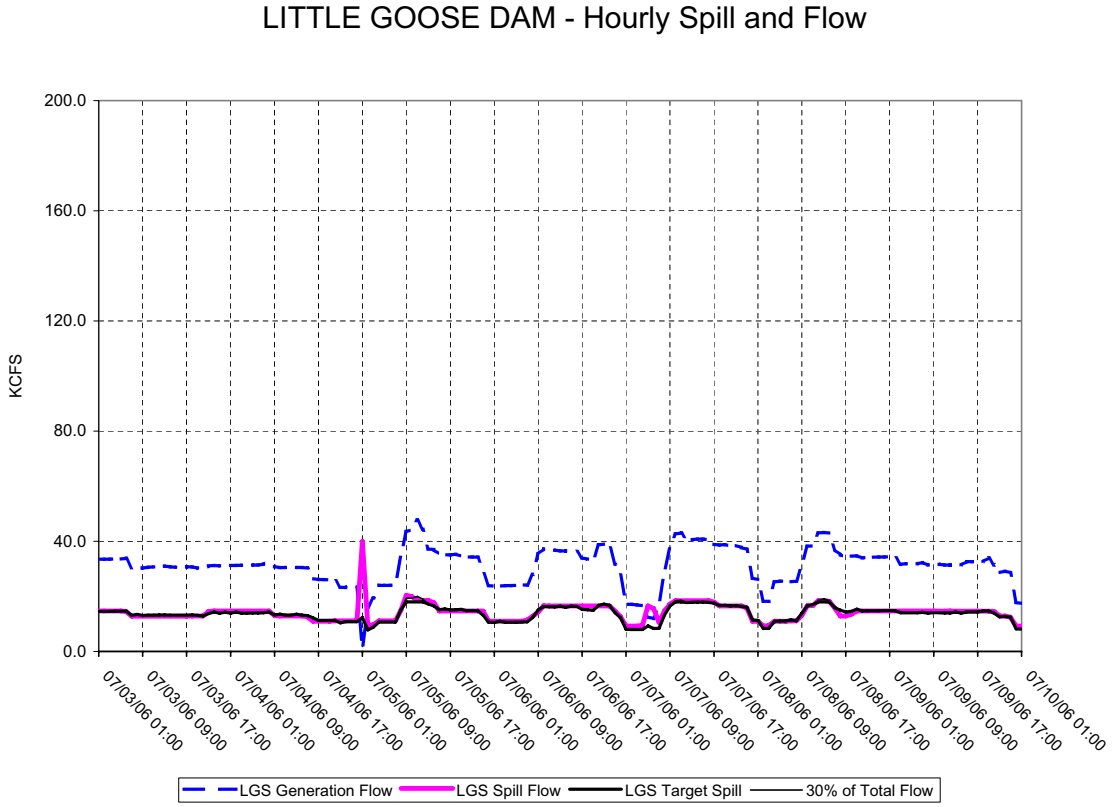
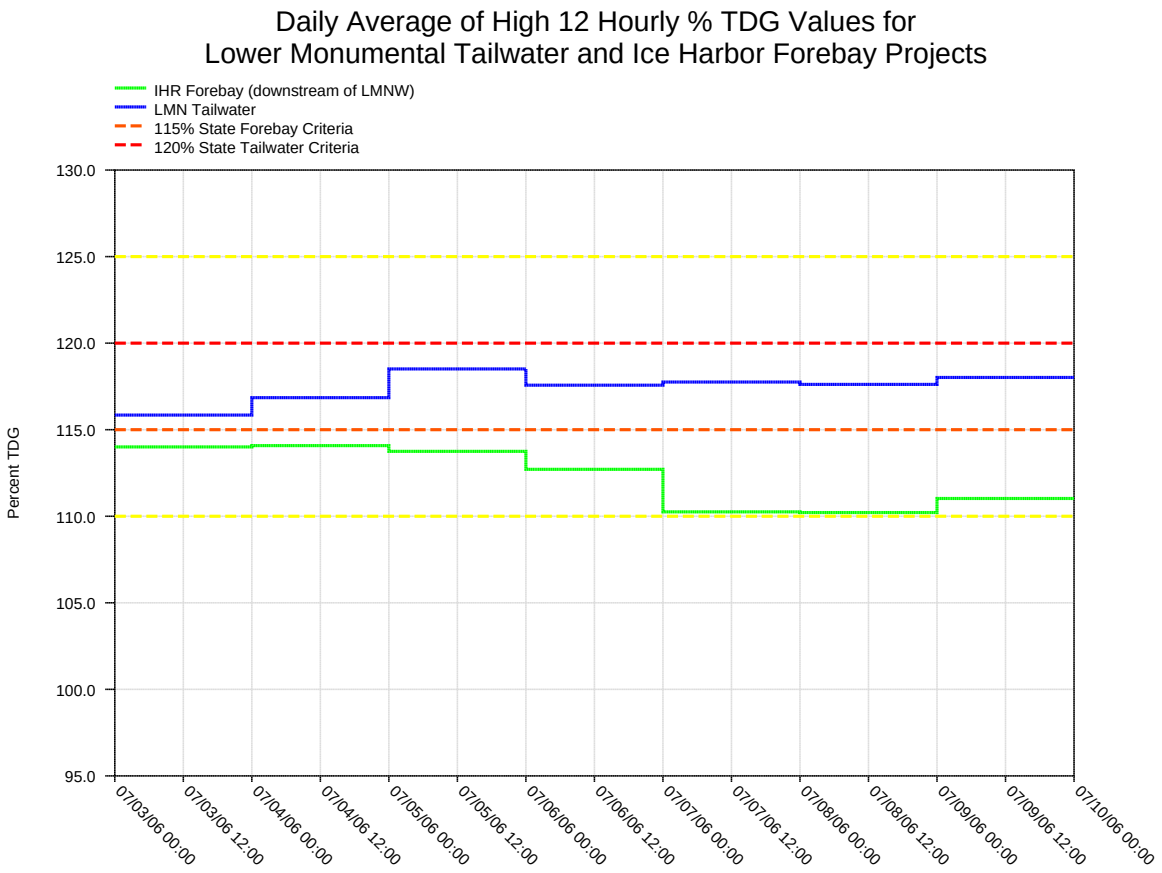

LITTLE GOOSE DAM - Hourly Spill and Flow
KCFS
200.0
160.0
120.0
80.0
40.0
0.0
07/03/06 01:00
07/03/06 09:00
07/03/06 17:00
07/04/06 01:00
07/04/06 09:00
07/04/06 17:00
07/05/06 01:00
07/05/06 09:00
07/05/06 17:00
07/06/06 01:00
07/06/06 09:00
07/06/06 17:00
07/07/06 01:00
07/07/06 09:00
07/07/06 17:00
07/08/06 01:00
07/08/06 09:00
07/08/06 17:00
07/09/06 01:00
07/09/06 09:00
07/09/06 17:00
07/10/06 01:00
LGS Generation Flow
LGS Spill Flow
LGS Target Spill
30% of Total Flow

Figure 3.


Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects
IHR Forebay (downstream of LMNW)
LMN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
07/03/06 00:00
07/03/06 12:00
07/04/06 00:00
07/04/06 12:00
07/05/06 00:00
07/05/06 12:00
07/06/06 00:00
07/06/06 12:00
07/07/06 00:00
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07/09/06 00:00
07/09/06 12:00
07/10/06 00:00

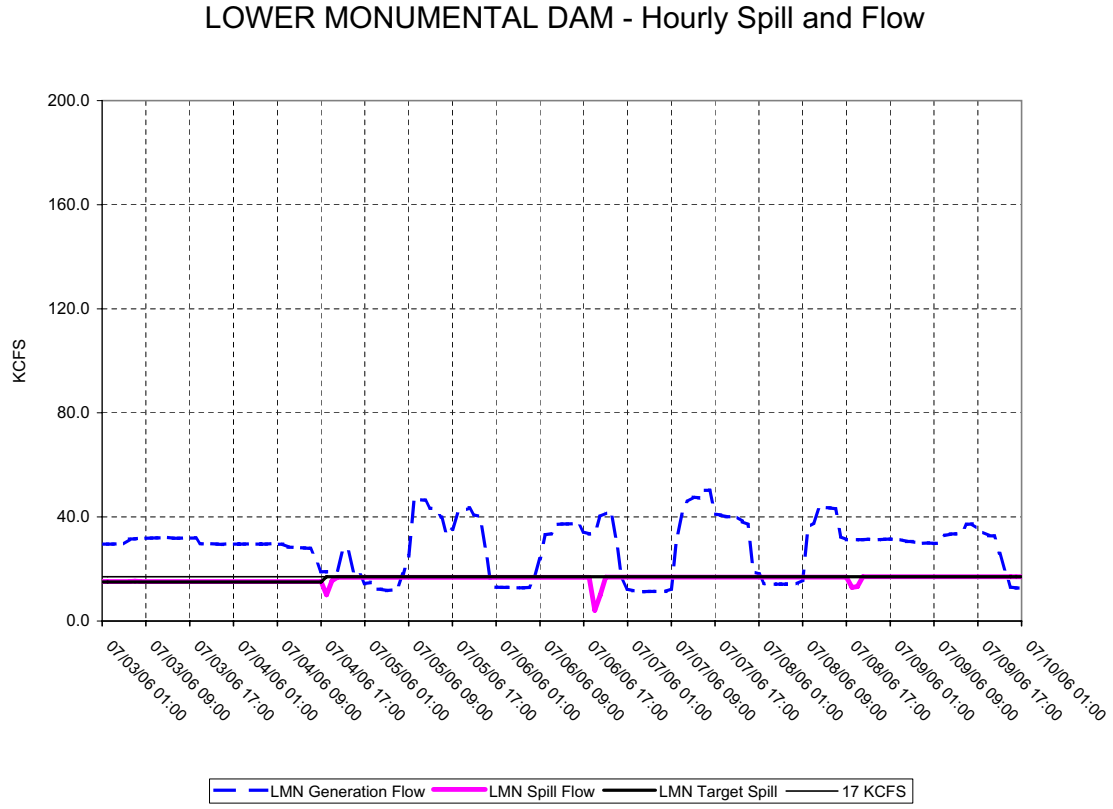
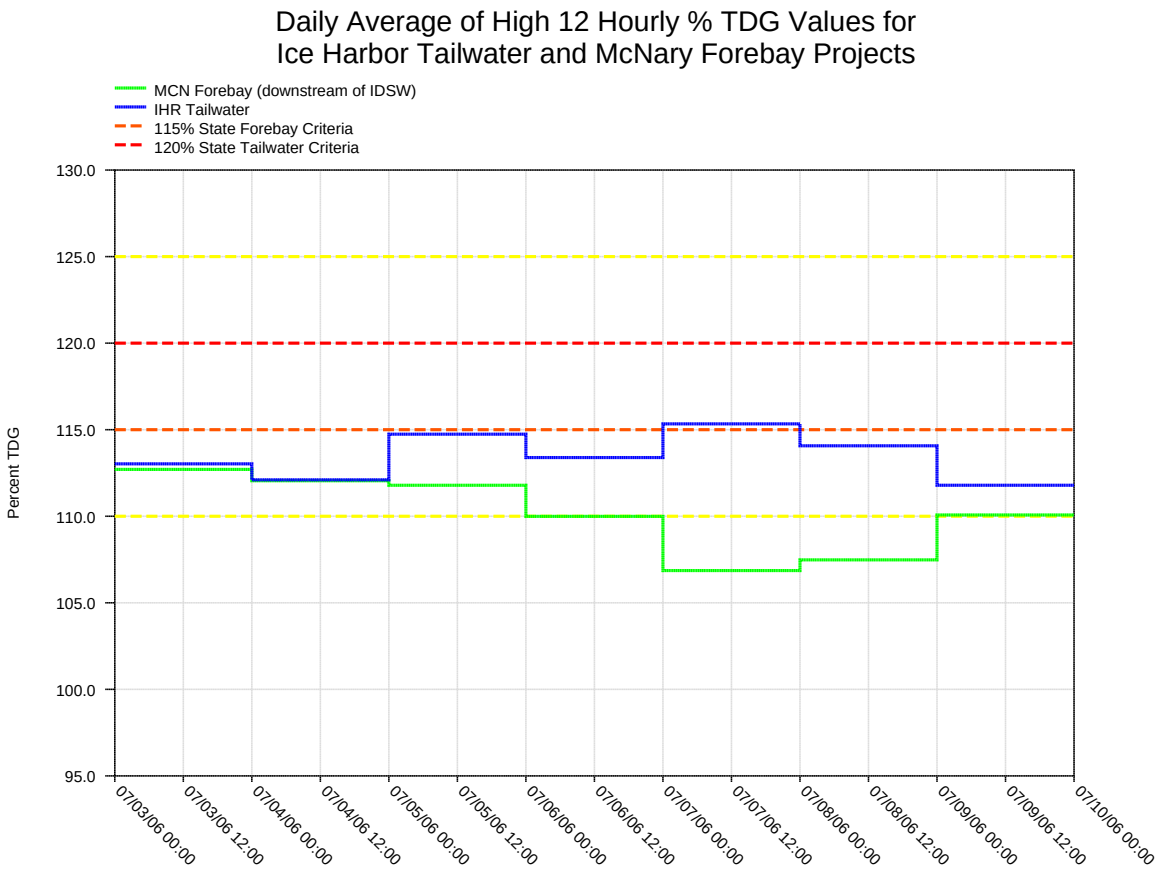

LOWER MONUMENTAL DAM - Hourly Spill and Flow
KCFS
200.0
160.0
120.0
80.0
40.0
0.0
07/03/06 01:00
07/03/06 09:00
07/03/06 17:00
07/04/06 01:00
07/04/06 09:00
07/04/06 17:00
07/05/06 01:00
07/05/06 09:00
07/05/06 17:00
07/06/06 01:00
07/06/06 09:00
07/06/06 17:00
07/07/06 01:00
07/07/06 09:00
07/07/06 17:00
07/08/06 01:00
07/08/06 09:00
07/08/06 17:00
07/09/06 01:00
07/09/06 09:00
07/09/06 17:00
07/10/06 01:00
LMN Generation Flow
LMN Spill Flow
LMN Target Spill
17 KCFS

Figure 4.


Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects
MCN Forebay (downstream of IDSW)
IHR Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
07/03/06 00:00
07/03/06 12:00
07/04/06 00:00
07/04/06 12:00
07/05/06 00:00
07/05/06 12:00
07/06/06 00:00
07/06/06 12:00
07/07/06 00:00
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07/09/06 00:00
07/09/06 12:00
07/10/06 00:00

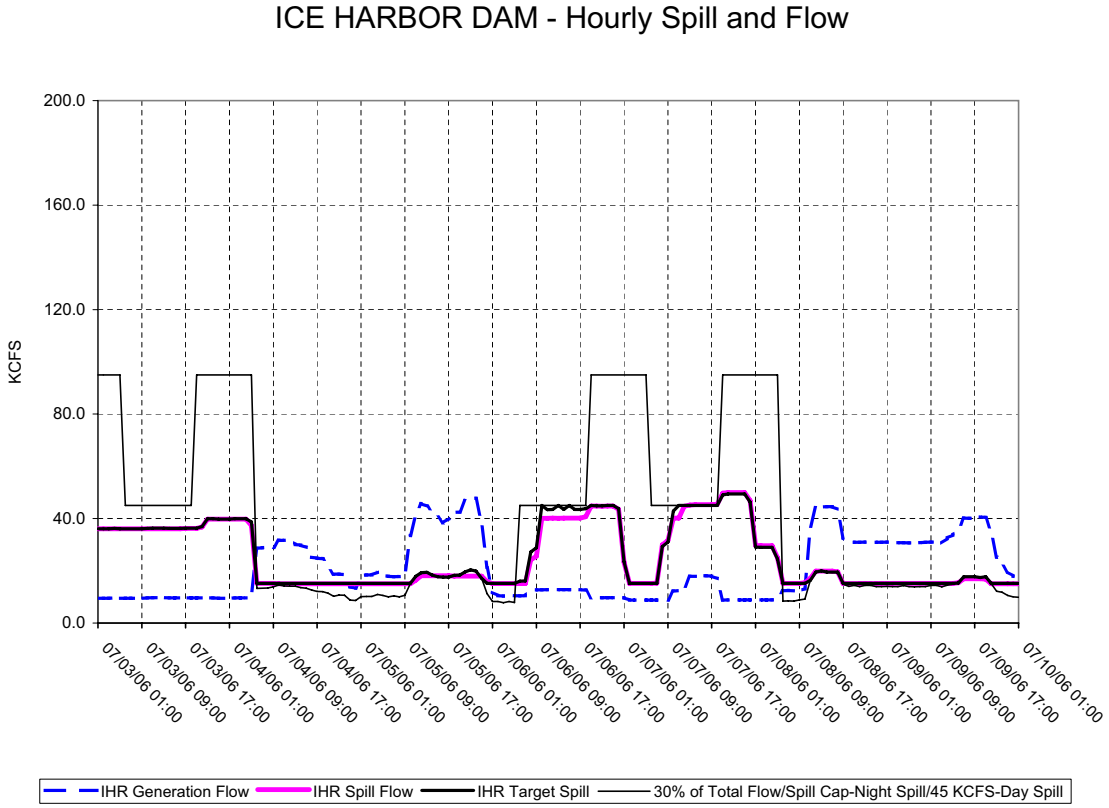
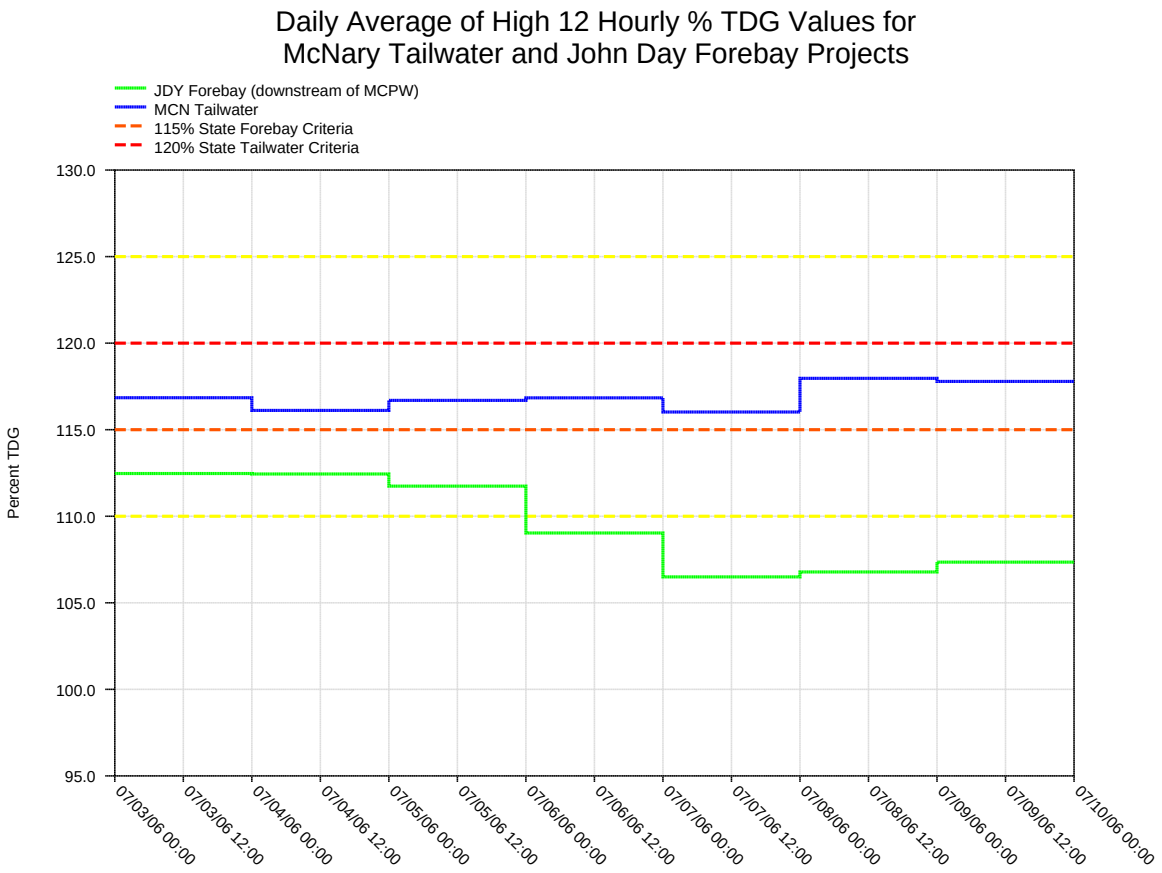

ICE HARBOR DAM - Hourly Spill and Flow
KCFS
200.0
160.0
120.0
80.0
40.0
0.0
07/03/06 01:00
07/03/06 09:00
07/03/06 17:00
07/04/06 01:00
07/04/06 09:00
07/04/06 17:00
07/05/06 01:00
07/05/06 09:00
07/05/06 17:00
07/06/06 01:00
07/06/06 09:00
07/06/06 17:00
07/07/06 01:00
07/07/06 09:00
07/07/06 17:00
07/08/06 01:00
07/08/06 09:00
07/08/06 17:00
07/09/06 01:00
07/09/06 09:00
07/09/06 17:00
07/10/06 01:00
IHR Generation Flow
IHR Spill Flow
IHR Target Spill
30% of Total Flow/Spill Cap-Night Spill/45 KCFS-Day Spill

Figure 5.


Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects
JDY Forebay (downstream of MCPW)
MCN Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
07/03/06 00:00
07/03/06 12:00
07/04/06 00:00
07/04/06 12:00
07/05/06 00:00
07/05/06 12:00
07/06/06 00:00
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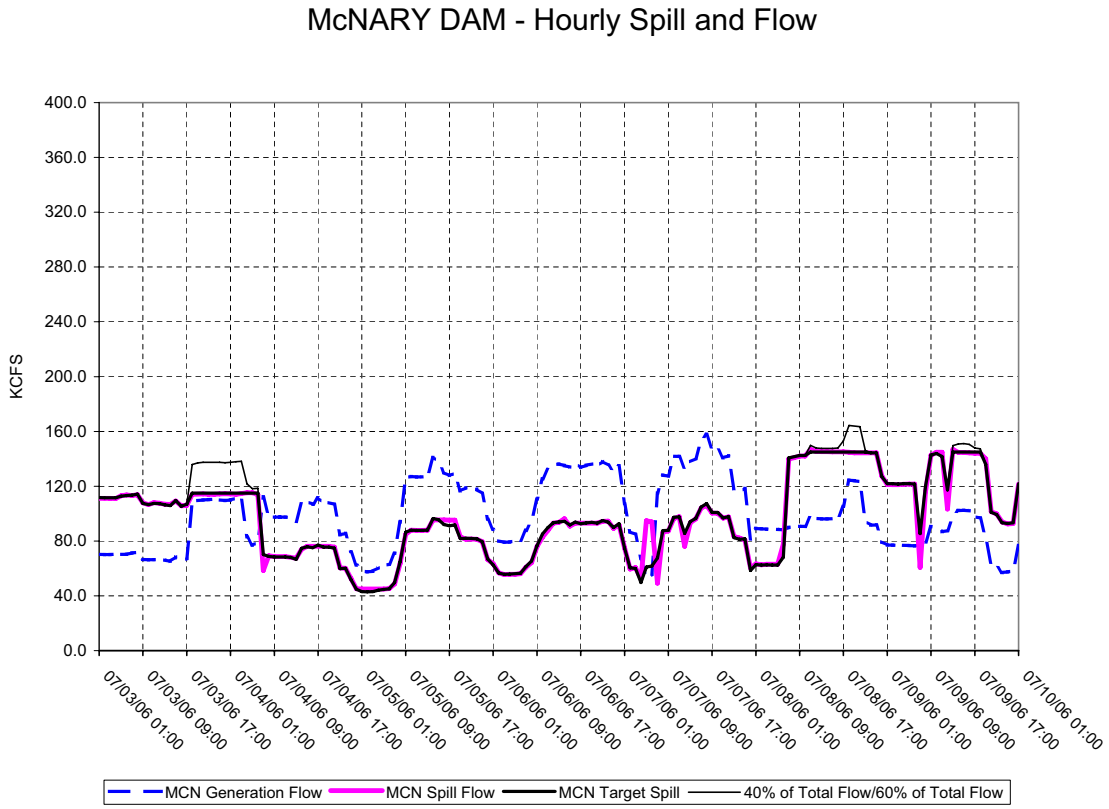
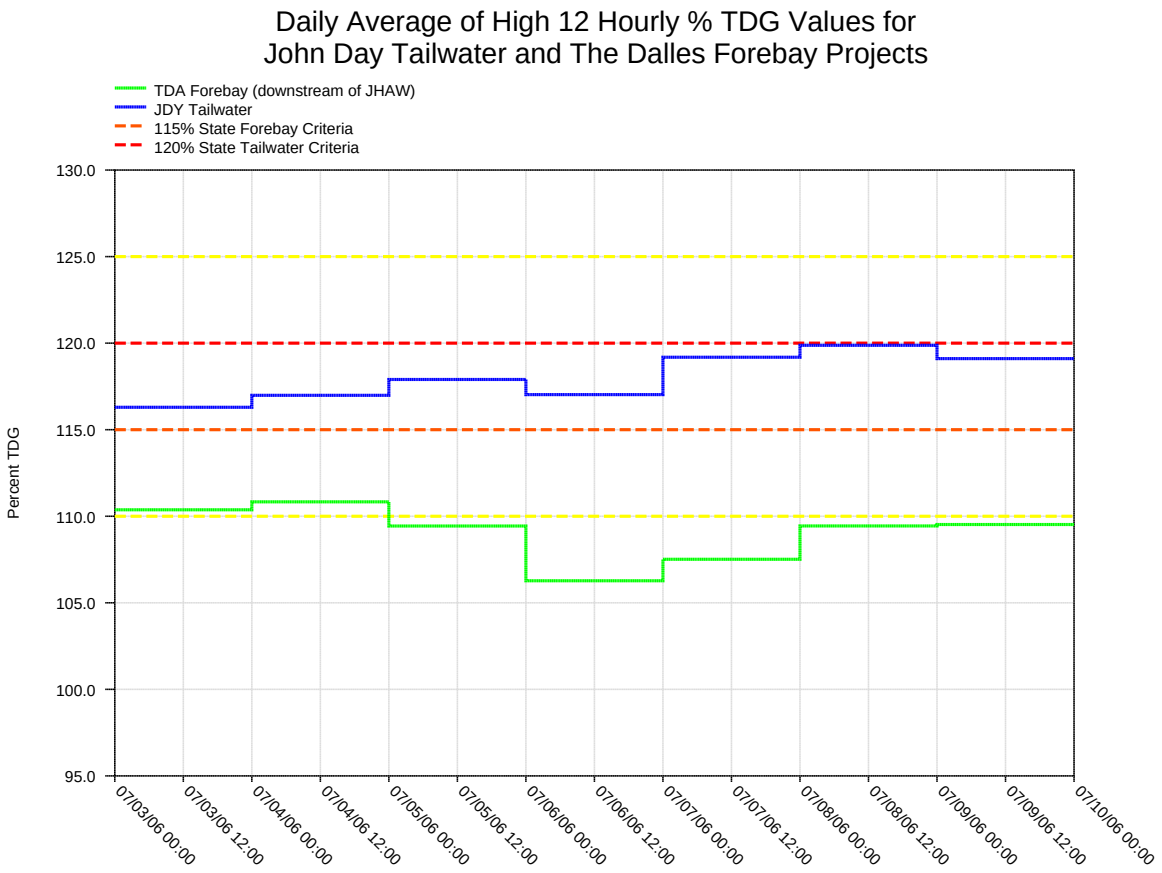

McNARY DAM - Hourly Spill and Flow
KCFS
400.0
360.0
320.0
280.0
240.0
200.0
160.0
120.0
80.0
40.0
0.0
07/03/06 01:00
07/03/06 09:00
07/03/06 17:00
07/04/06 01:00
07/04/06 09:00
07/04/06 17:00
07/05/06 01:00
07/05/06 09:00
07/05/06 17:00
07/06/06 01:00
07/06/06 09:00
07/06/06 17:00
07/07/06 01:00
07/07/06 09:00
07/07/06 17:00
07/08/06 01:00
07/08/06 09:00
07/08/06 17:00
07/09/06 01:00
07/09/06 09:00
07/09/06 17:00
07/10/06 01:00
MCN Generation Flow
MCN Spill Flow
MCN Target Spill
40% of Total Flow/60% of Total Flow

Figure 6.


Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects
TDA Forebay (downstream of JHAW)
JDY Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
07/03/06 00:00
07/03/06 12:00
07/04/06 00:00
07/04/06 12:00
07/05/06 00:00
07/05/06 12:00
07/06/06 00:00
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07/09/06 12:00
07/10/06 00:00

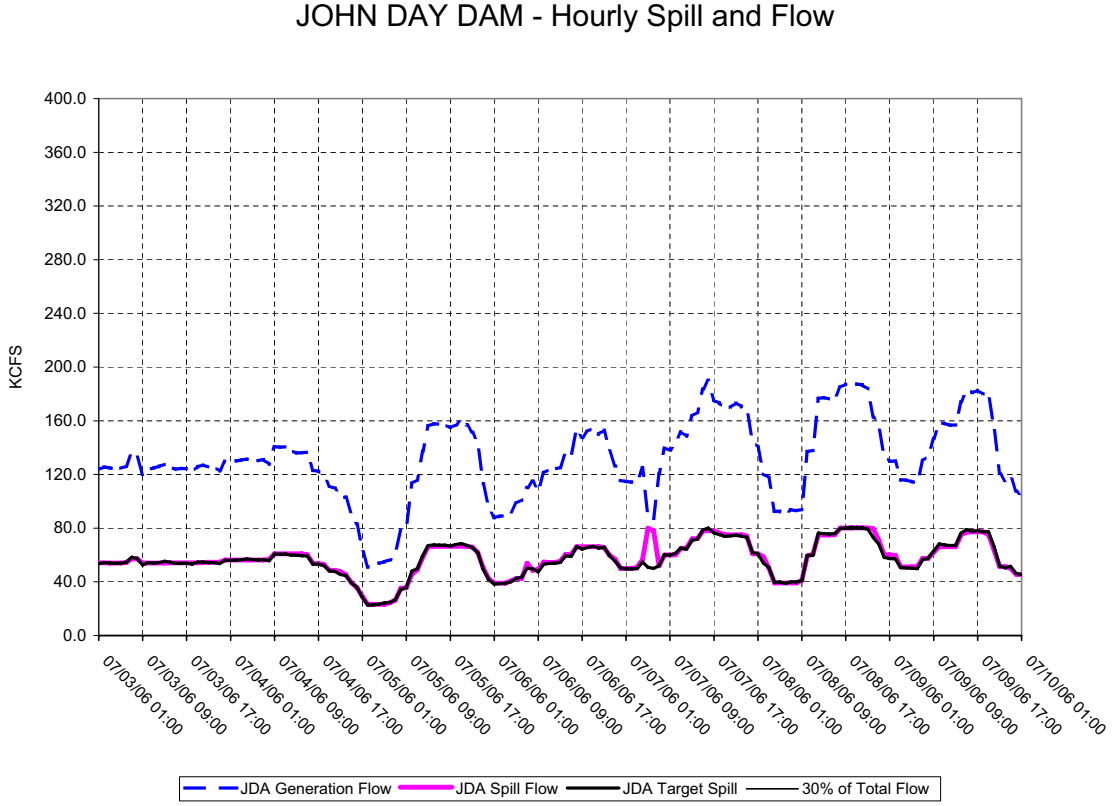
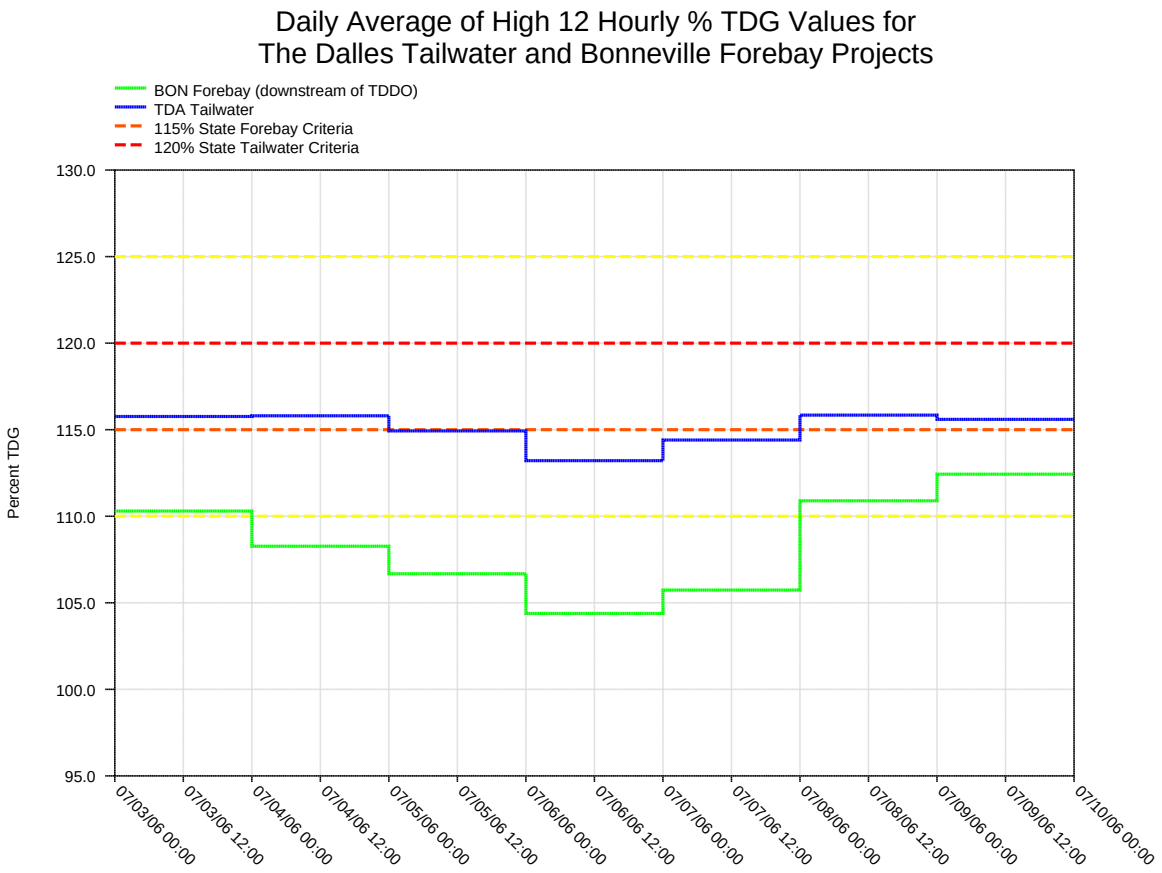

JOHN DAY DAM - Hourly Spill and Flow
KCFS
400.0
360.0
320.0
280.0
240.0
200.0
160.0
120.0
80.0
40.0
0.0
07/03/06 01:00
07/03/06 09:00
07/03/06 17:00
07/04/06 01:00
07/04/06 09:00
07/04/06 17:00
07/05/06 01:00
07/05/06 09:00
07/05/06 17:00
07/06/06 01:00
07/06/06 09:00
07/06/06 17:00
07/07/06 01:00
07/07/06 09:00
07/07/06 17:00
07/08/06 01:00
07/08/06 09:00
07/08/06 17:00
07/09/06 01:00
07/09/06 09:00
07/09/06 17:00
07/10/06 01:00
JDA Generation Flow
JDA Spill Flow
JDA Target Spill
30% of Total Flow

Figure 7.


Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects
BON Forebay (downstream of TDDO)
TDA Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
07/03/06 00:00
07/03/06 12:00
07/04/06 00:00
07/04/06 12:00
07/05/06 00:00
07/05/06 12:00
07/06/06 00:00
07/06/06 12:00
07/07/06 00:00
07/07/06 12:00
07/08/06 00:00
07/08/06 12:00
07/09/06 00:00
07/09/06 12:00
07/10/06 00:00

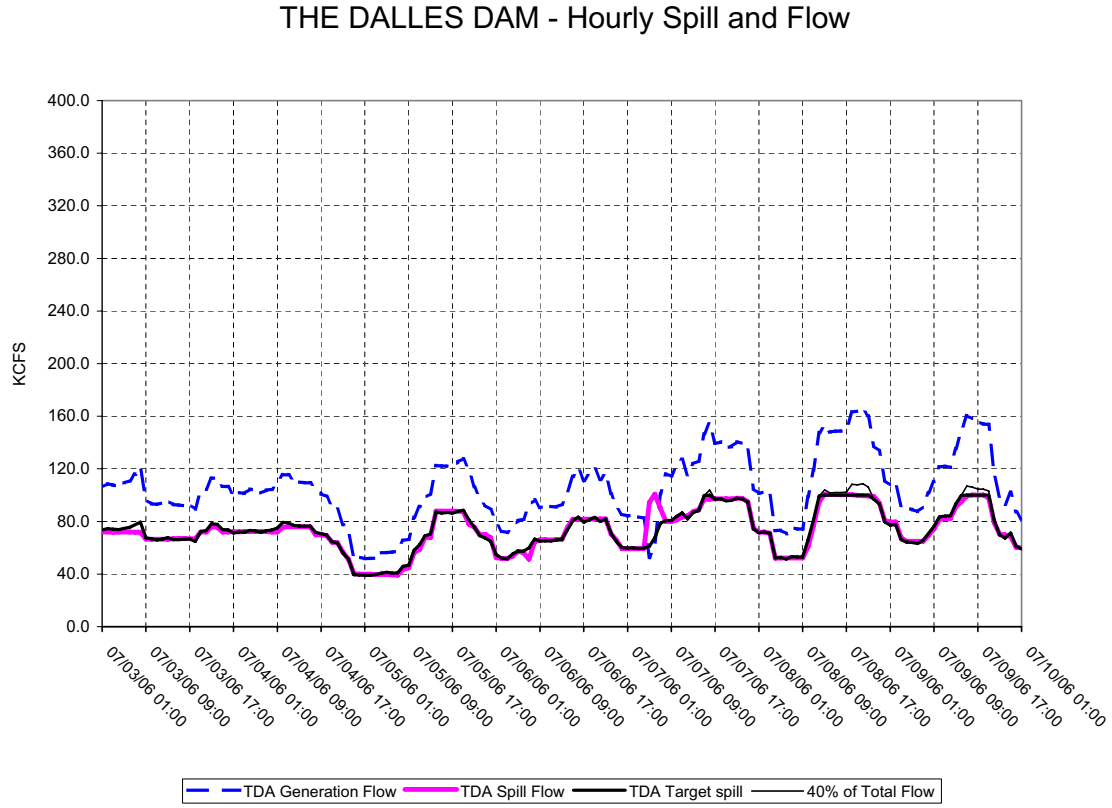
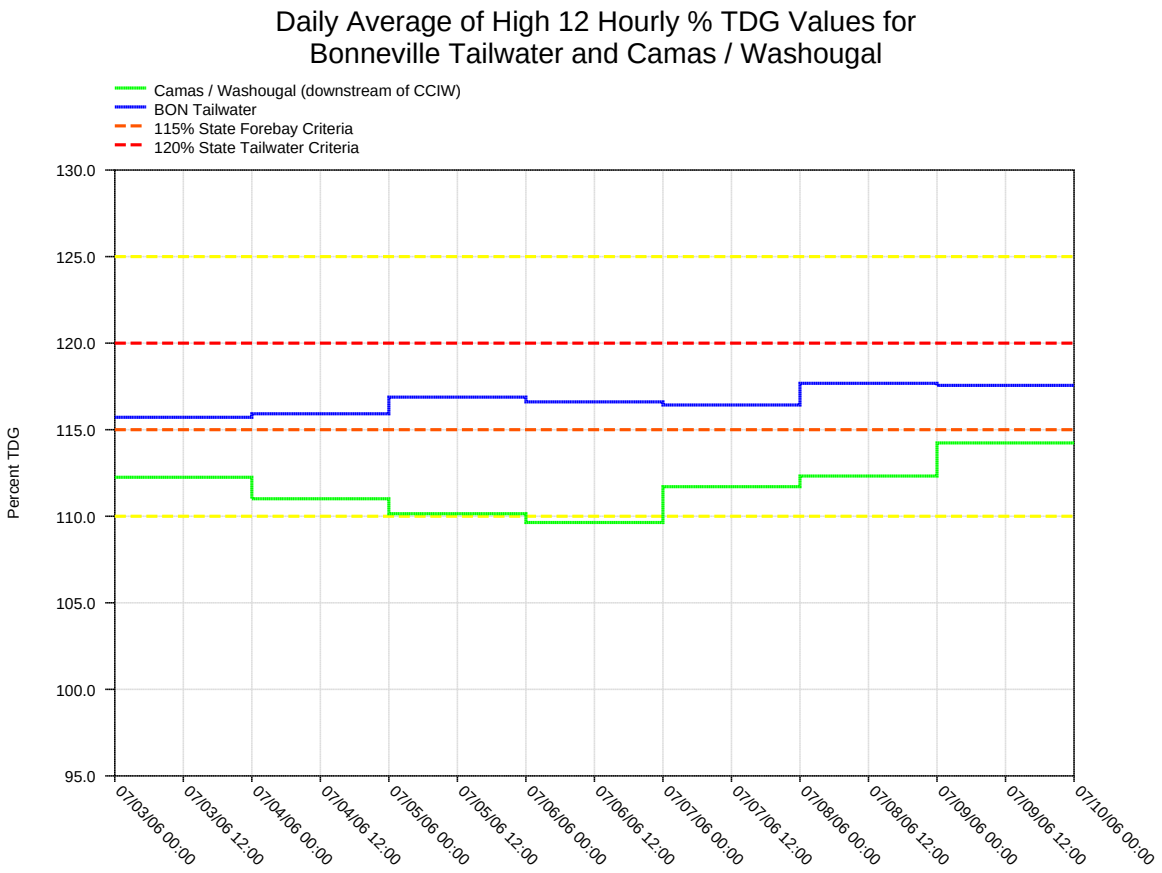

THE DALLES DAM - Hourly Spill and Flow
KCFS
400.0
360.0
320.0
280.0
240.0
200.0
160.0
120.0
80.0
40.0
0.0
07/03/06 01:00
07/03/06 09:00
07/03/06 17:00
07/04/06 01:00
07/04/06 09:00
07/04/06 17:00
07/05/06 01:00
07/05/06 09:00
07/05/06 17:00
07/06/06 01:00
07/06/06 09:00
07/06/06 17:00
07/07/06 01:00
07/07/06 09:00
07/07/06 17:00
07/08/06 01:00
07/08/06 09:00
07/08/06 17:00
07/09/06 01:00
07/09/06 09:00
07/09/06 17:00
07/10/06 01:00
TDA Generation Flow
TDA Spill Flow
TDA Target spill
40% of Total Flow

Figure 8.


Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal
Camas / Washougal (downstream of CCIW)
BON Tailwater
115% State Forebay Criteria
120% State Tailwater Criteria
Percent TDG
130.0
125.0
120.0
115.0
110.0
105.0
100.0
95.0
07/03/06 00:00
07/03/06 12:00
07/04/06 00:00
07/04/06 12:00
07/05/06 00:00
07/05/06 12:00
07/06/06 00:00
07/06/06 12:00
07/07/06 00:00
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07/09/06 00:00
07/09/06 12:00
07/10/06 00:00

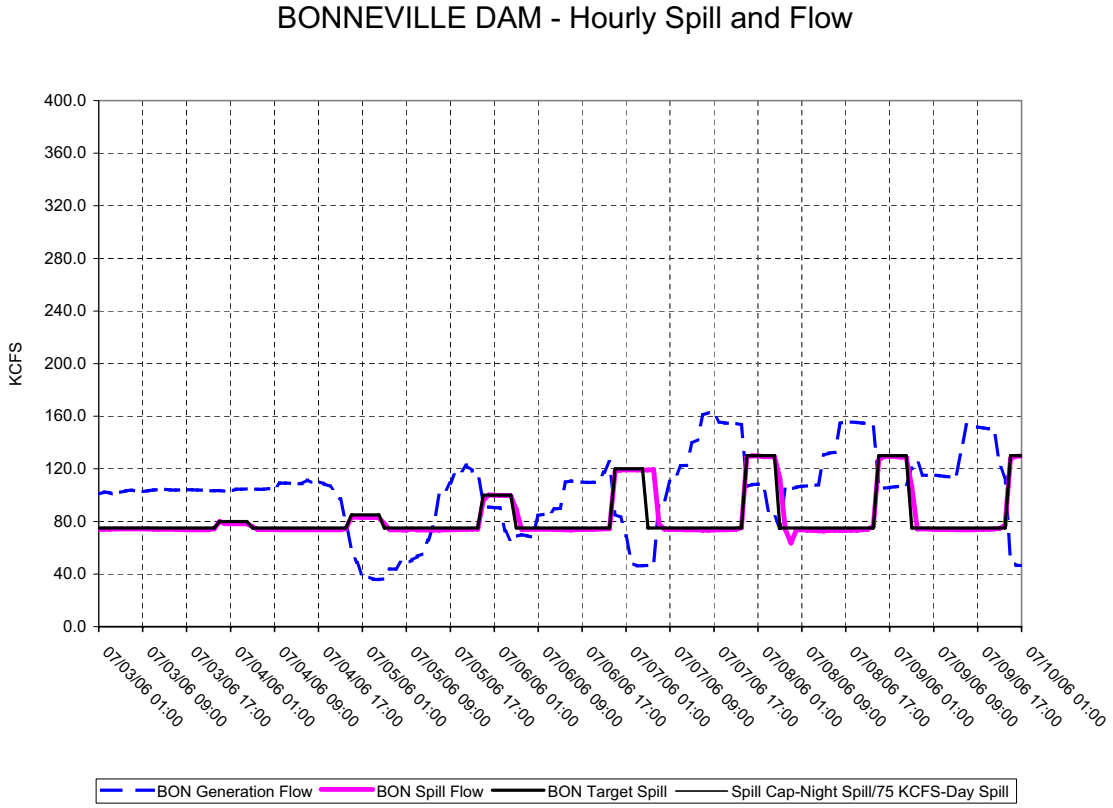
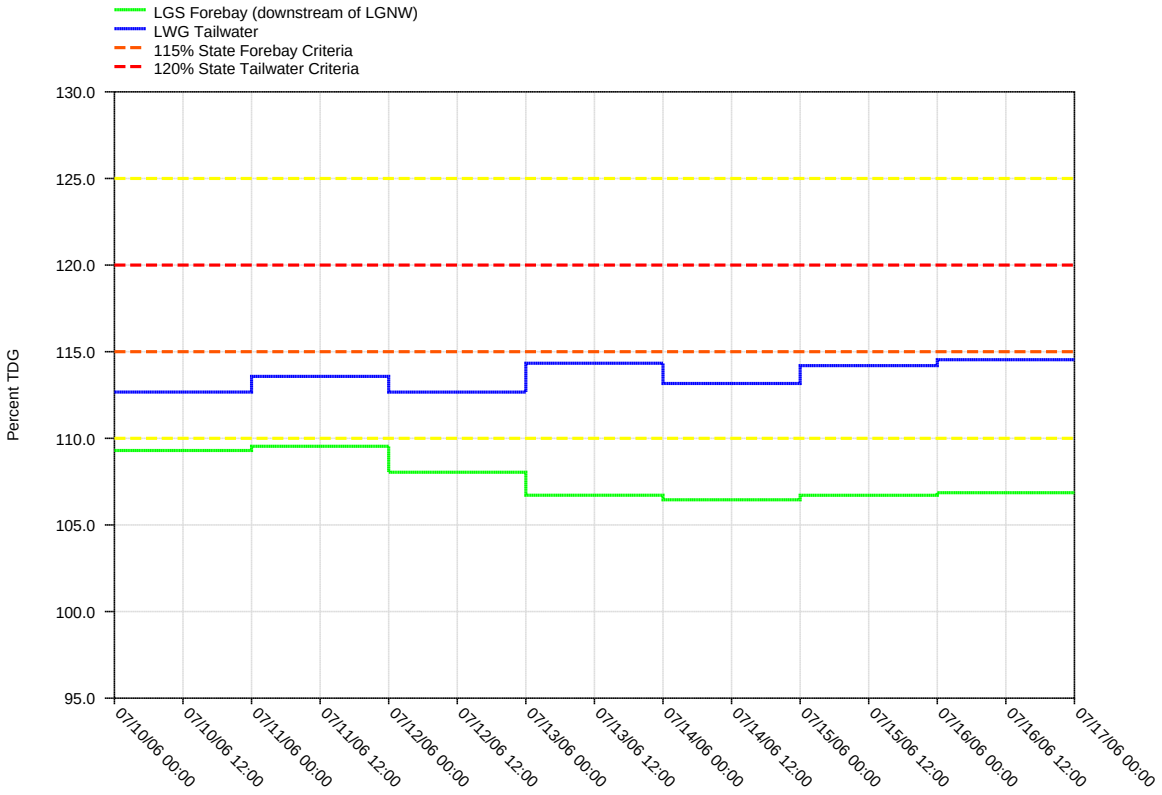

BONNEVILLE DAM - Hourly Spill and Flow
KCFS
400.0
360.0
320.0
280.0
240.0
200.0
160.0
120.0
80.0
40.0
0.0
07/03/06 01:00
07/03/06 09:00
07/03/06 17:00
07/04/06 01:00
07/04/06 09:00
07/04/06 17:00
07/05/06 01:00
07/05/06 09:00
07/05/06 17:00
07/06/06 01:00
07/06/06 09:00
07/06/06 17:00
07/07/06 01:00
07/07/06 09:00
07/07/06 17:00
07/08/06 01:00
07/08/06 09:00
07/08/06 17:00
07/09/06 01:00
07/09/06 09:00
07/09/06 17:00
07/10/06 01:00
BON Generation Flow
BON Spill Flow
BON Target Spill
Spill Cap-Night Spill/75 KCFS-Day Spill

Figure 9.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

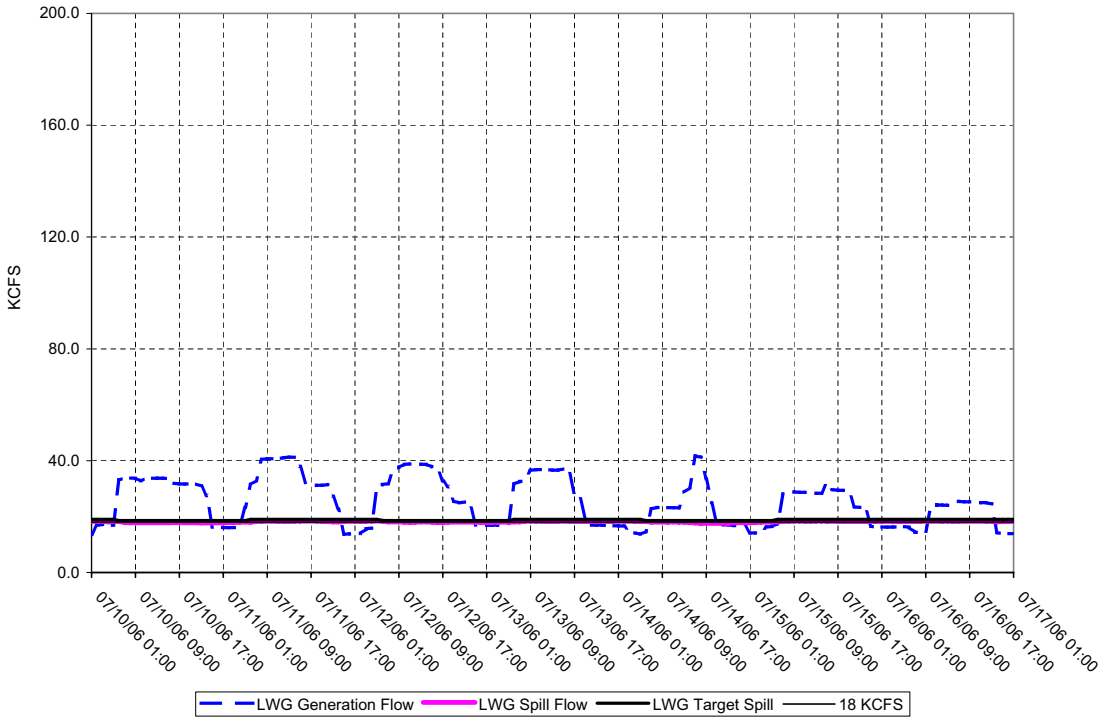
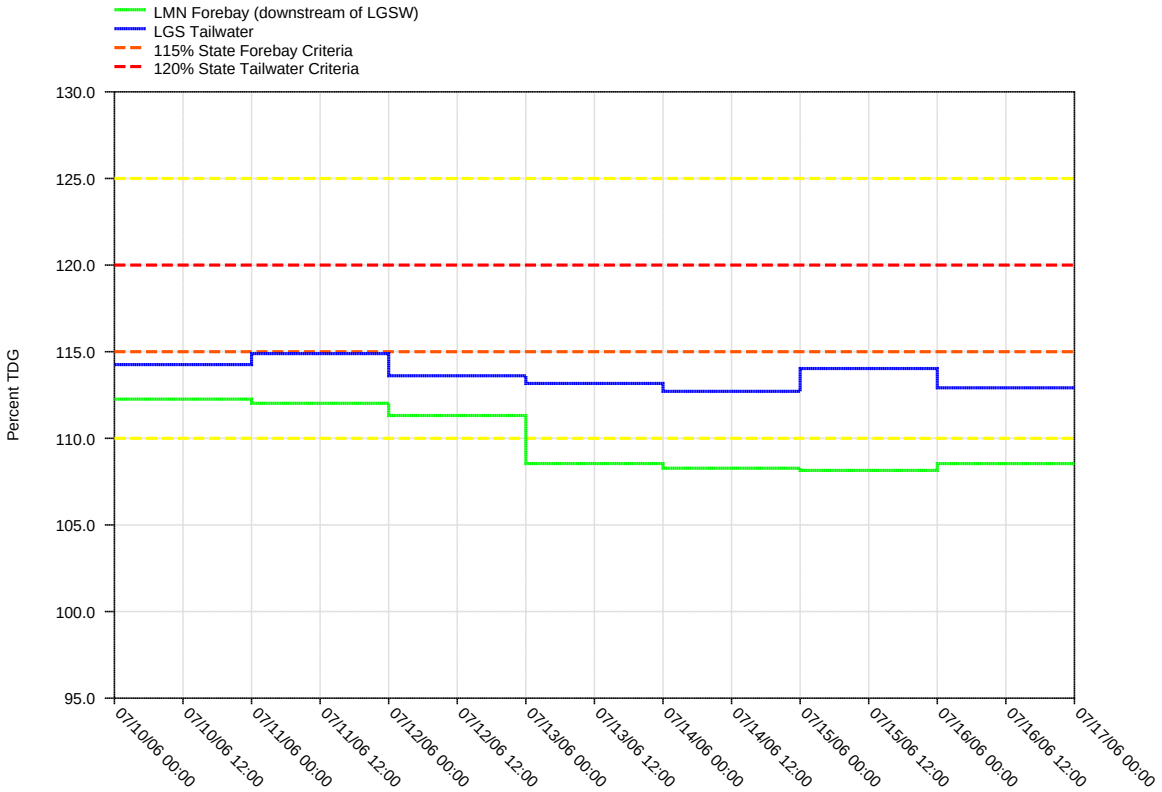


Figure 10.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

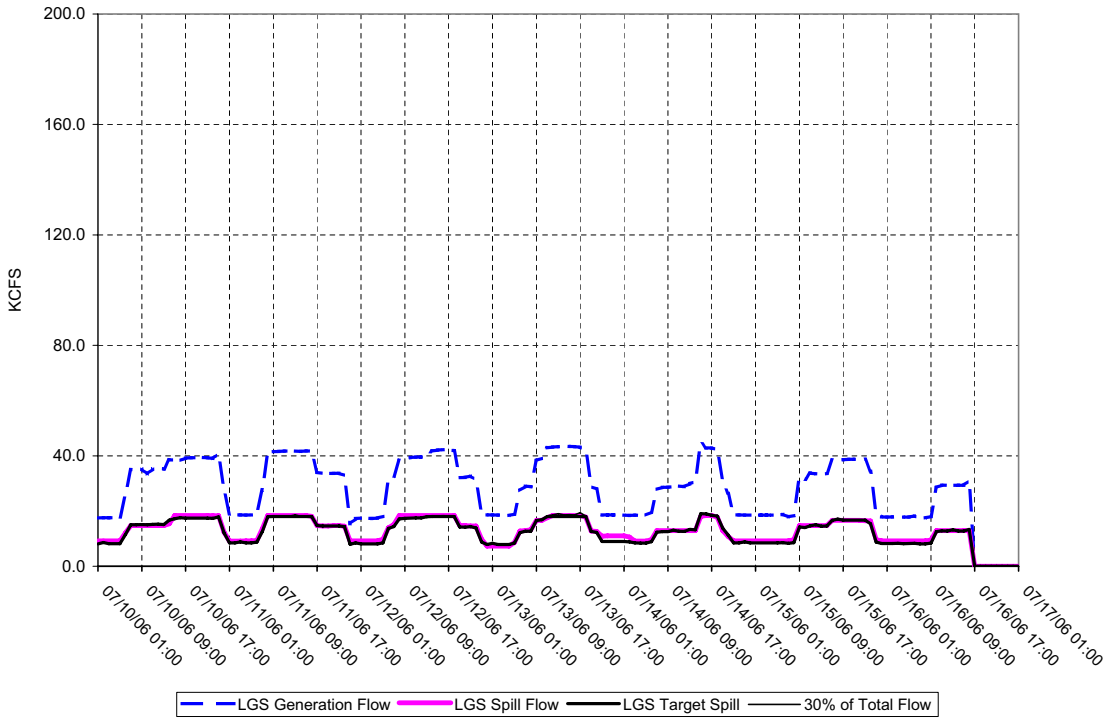
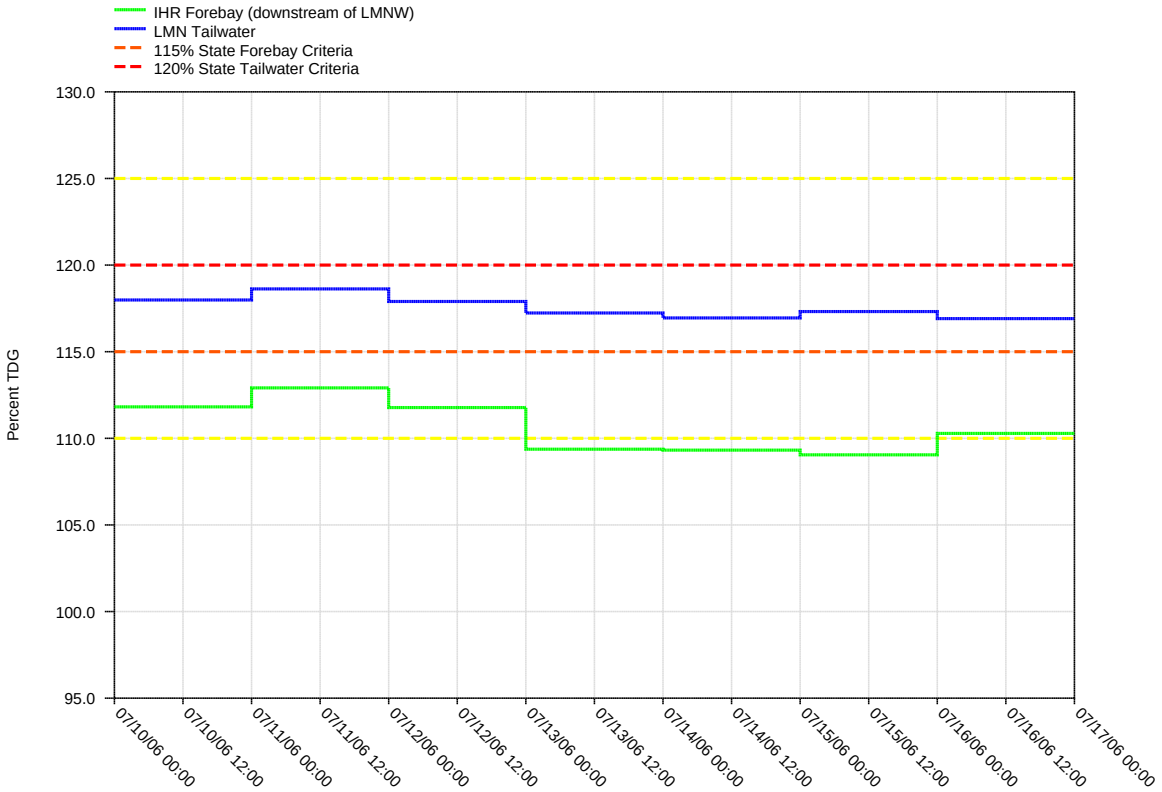


Figure 11.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

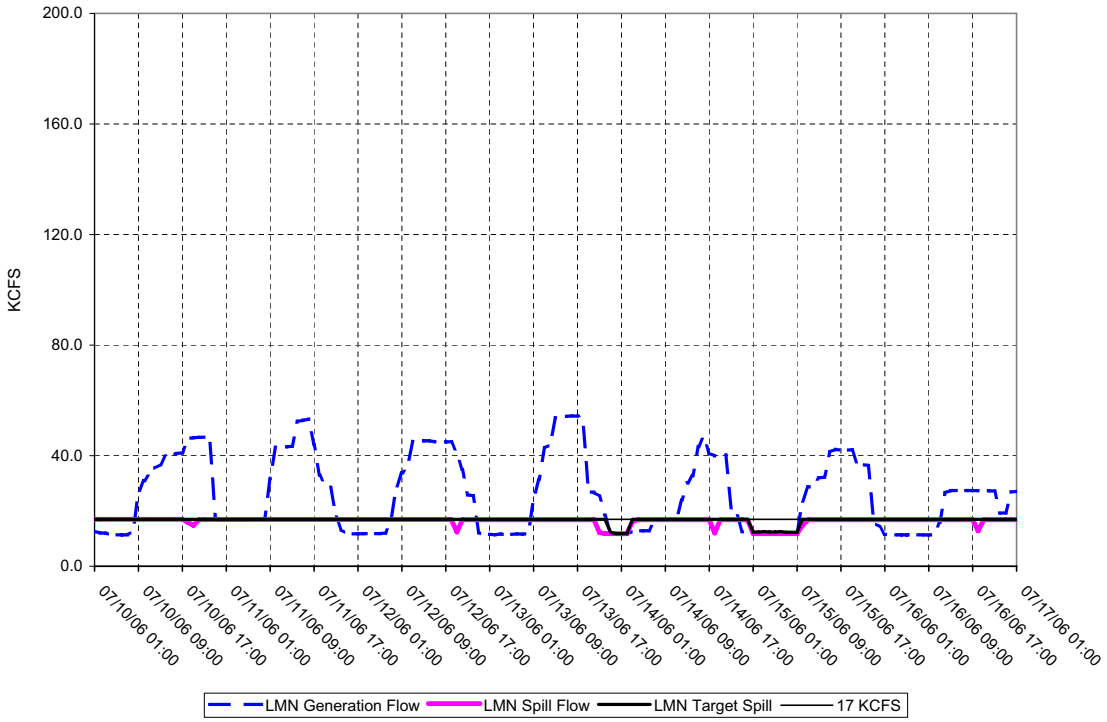
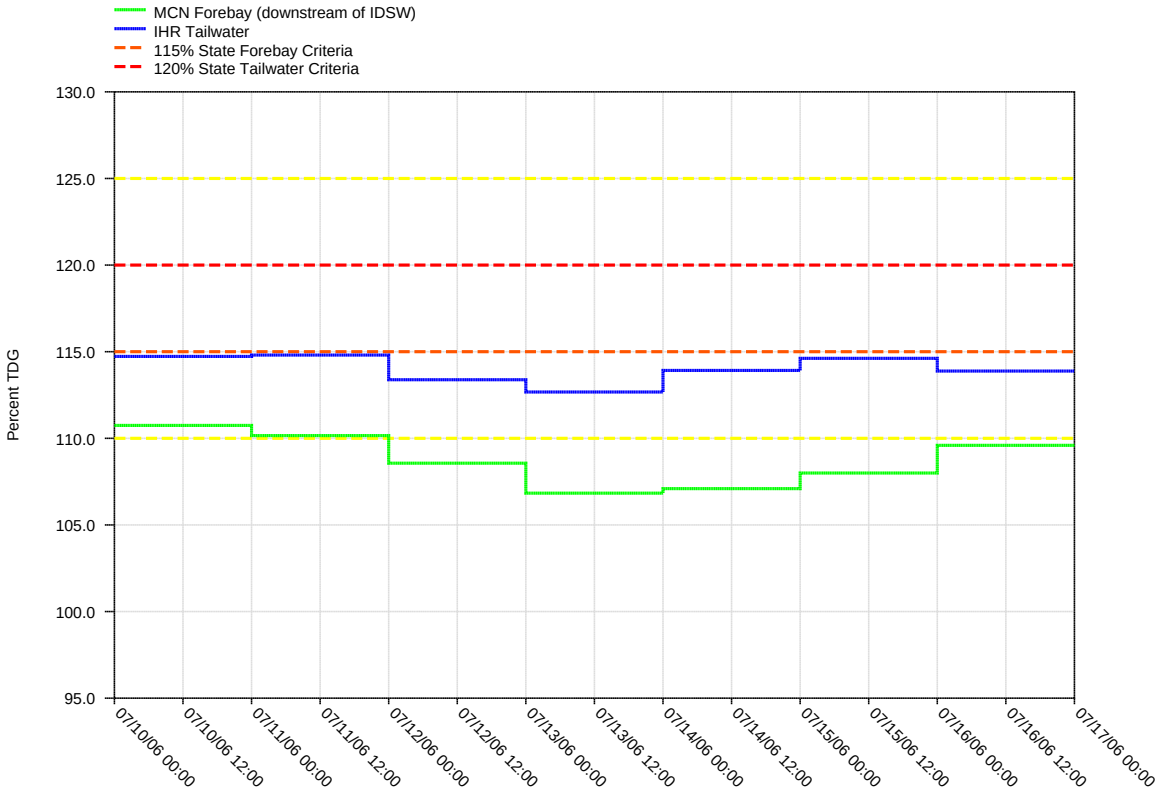


Figure 12.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

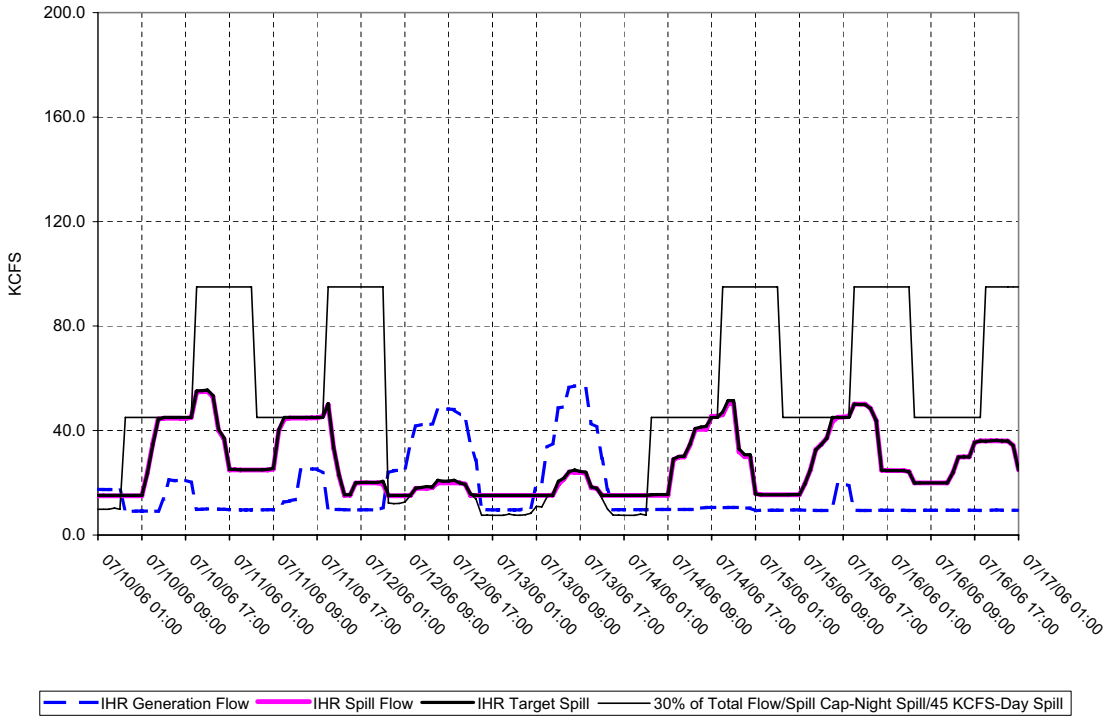
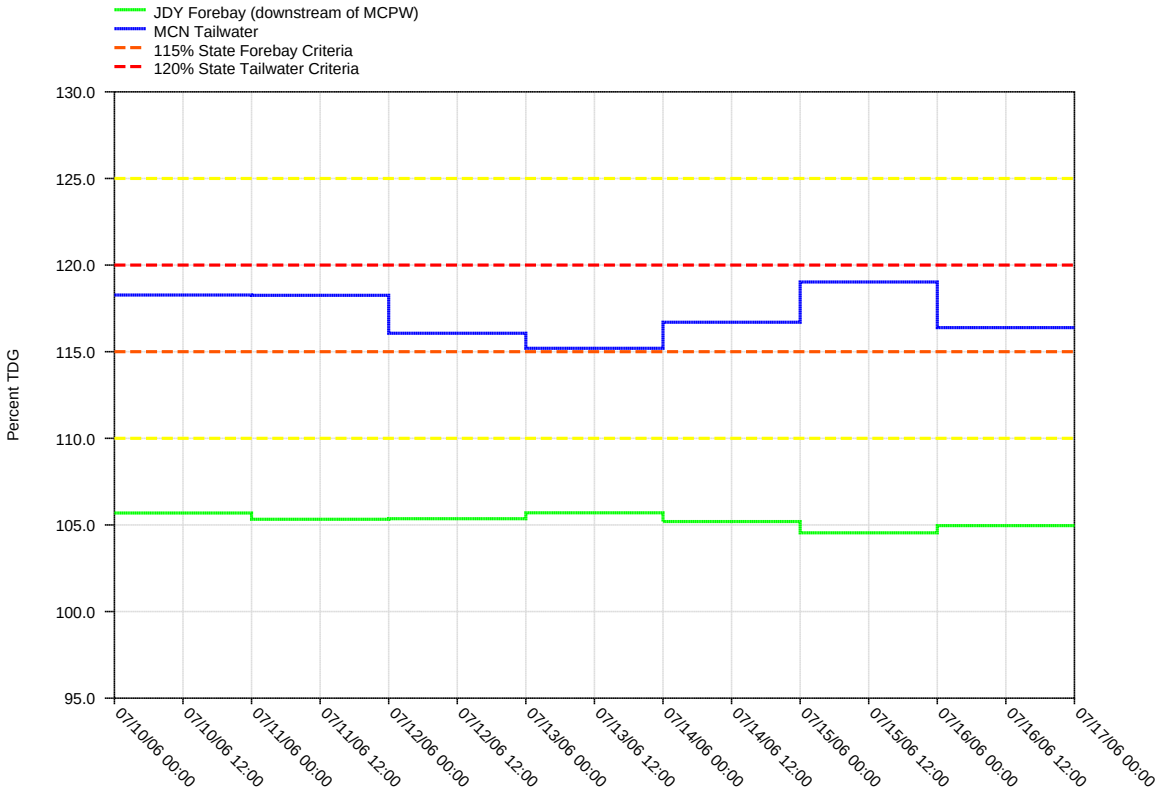


Figure 13.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

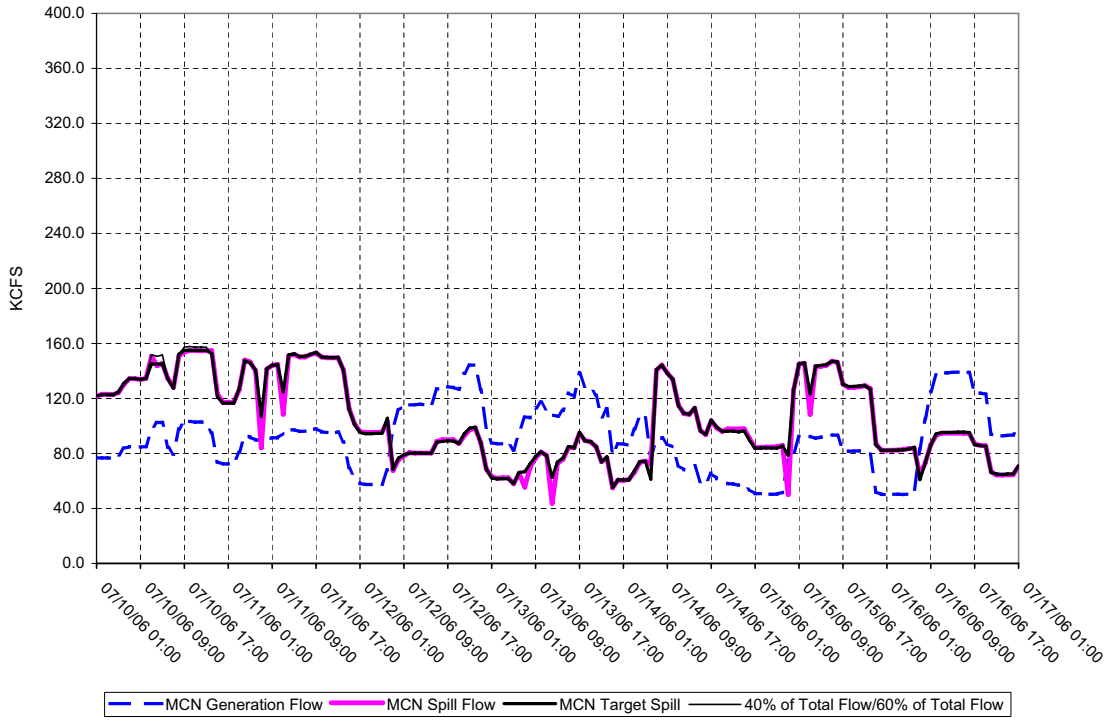
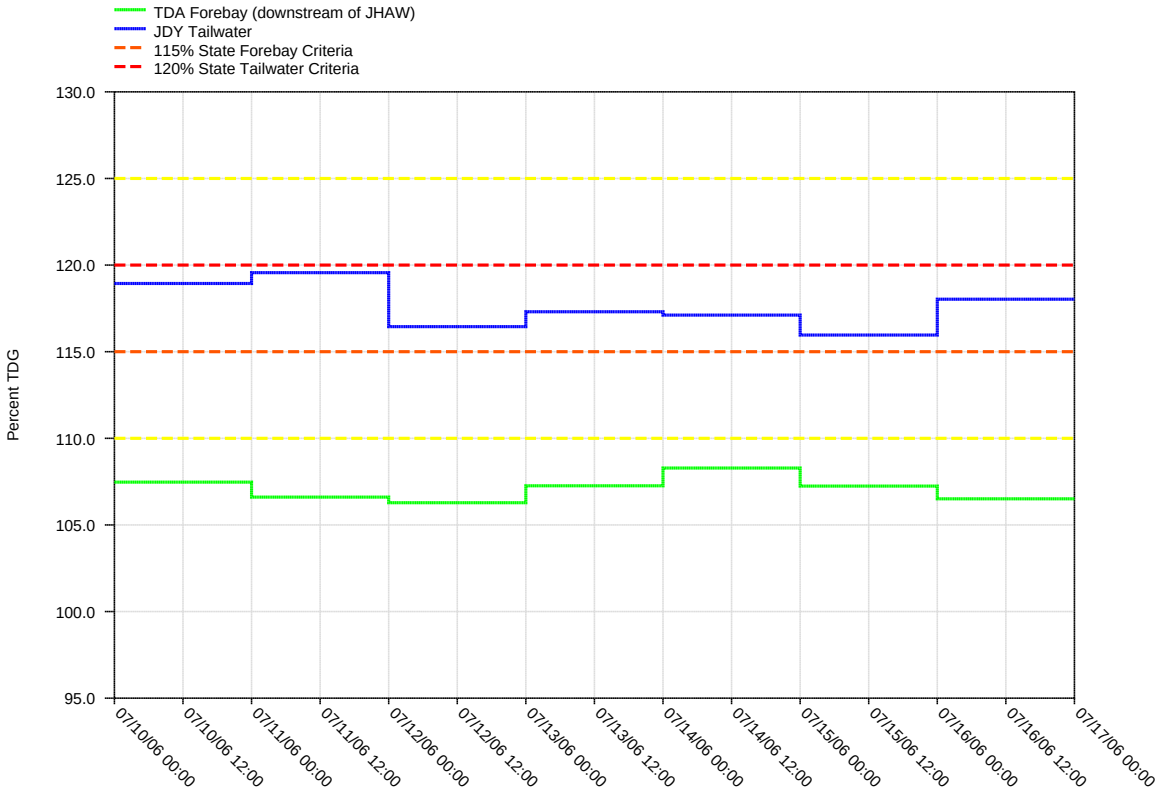


Figure 14.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

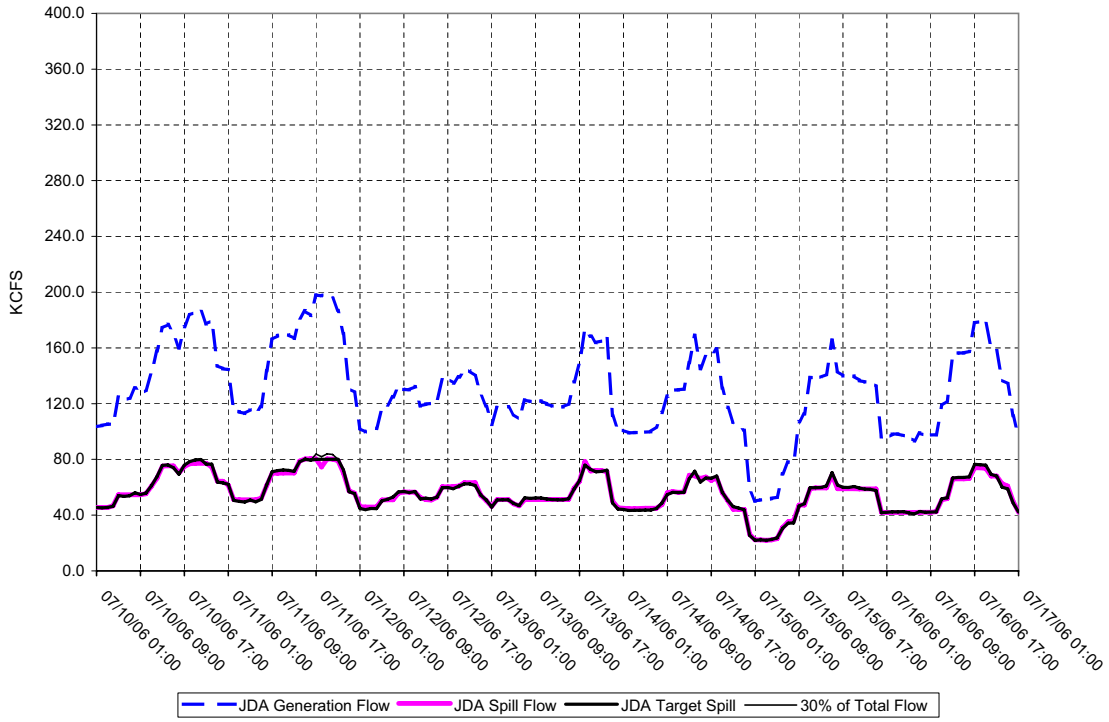
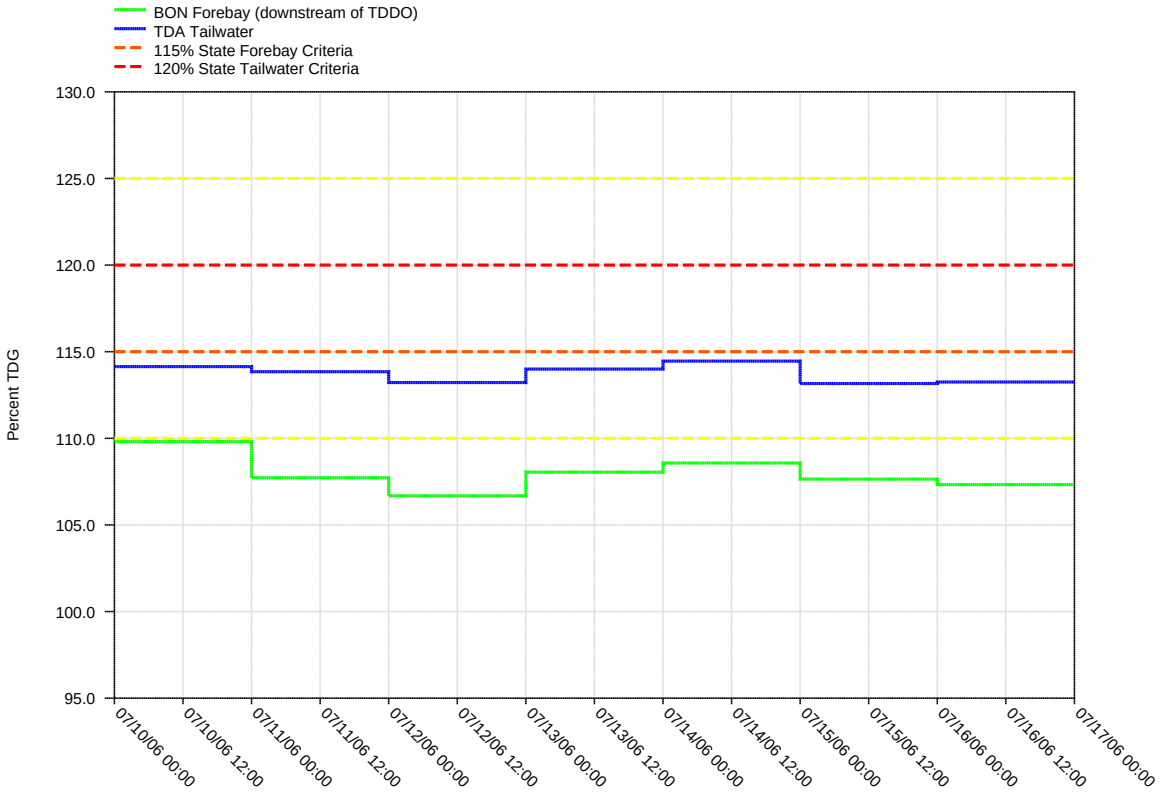


Figure 15.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

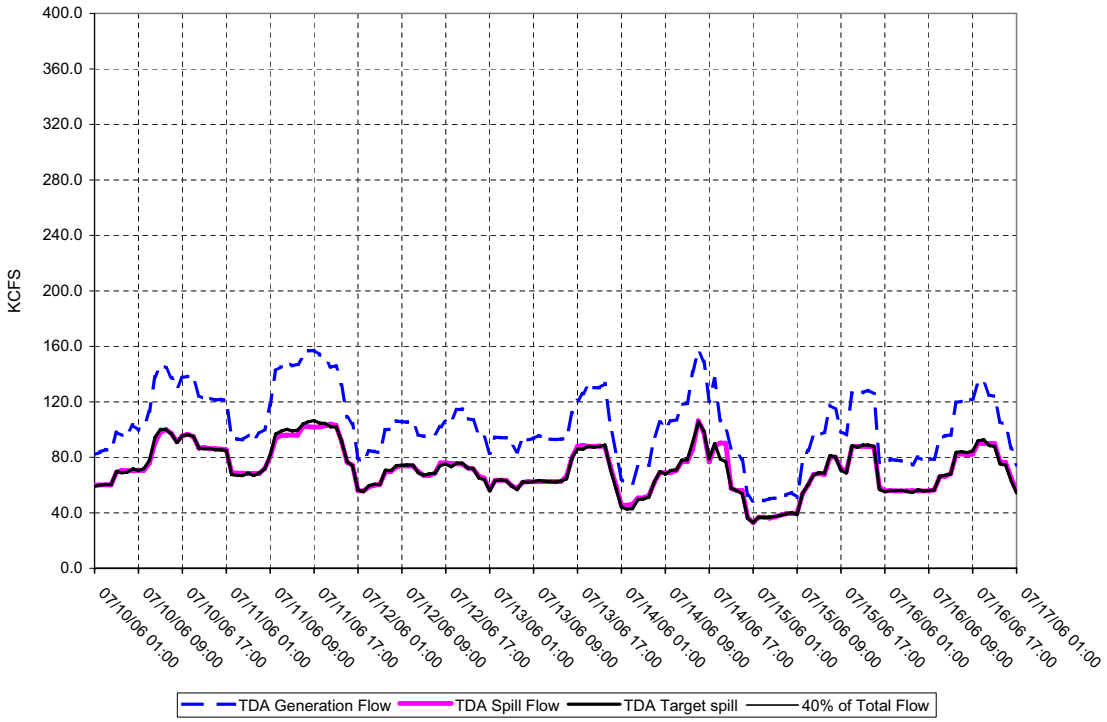
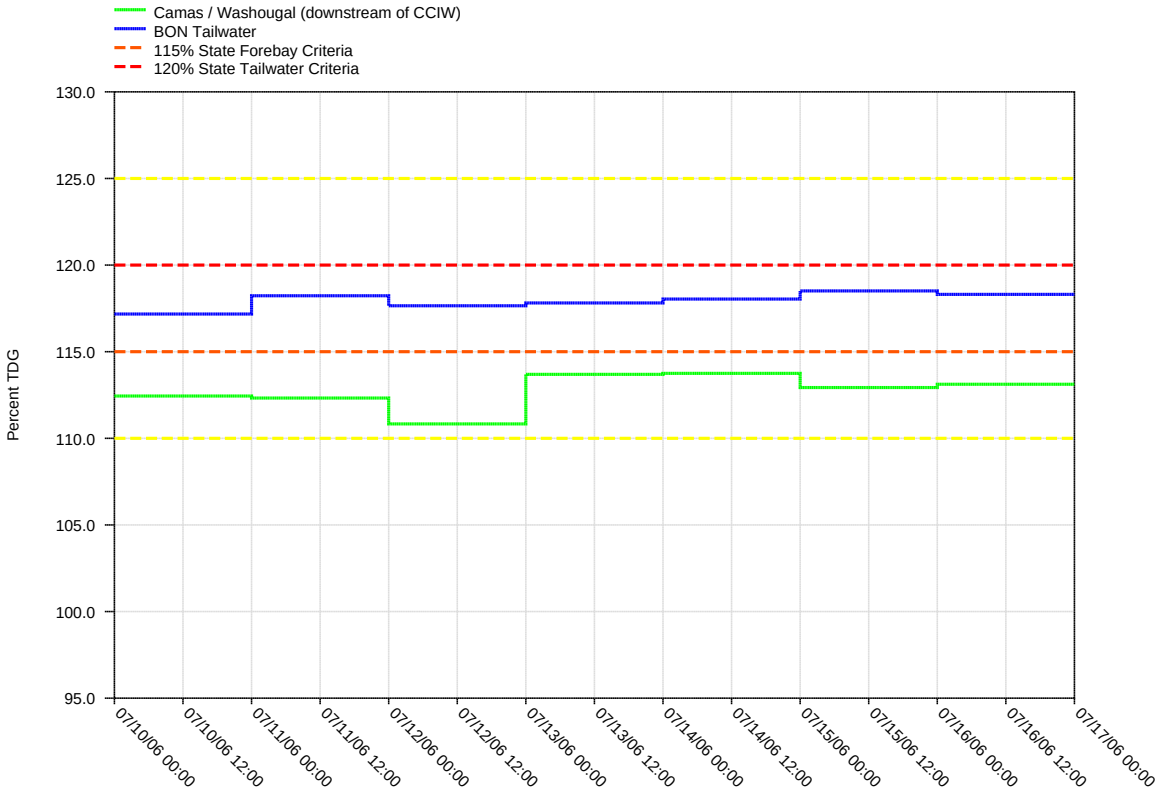


Figure 16.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

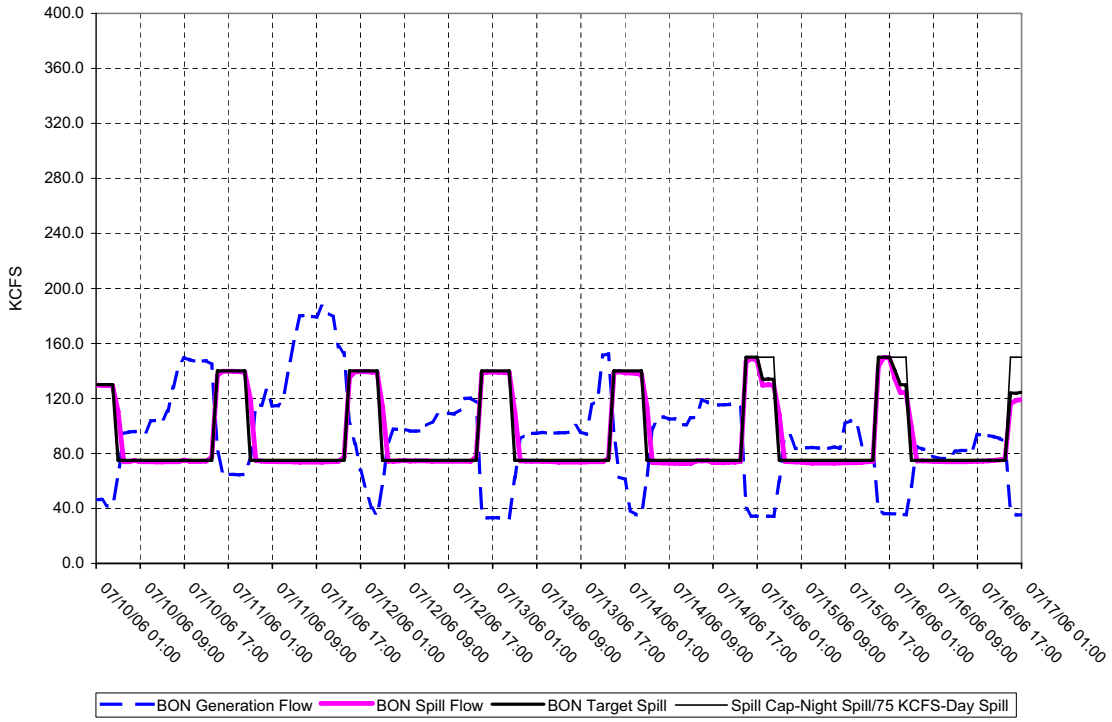
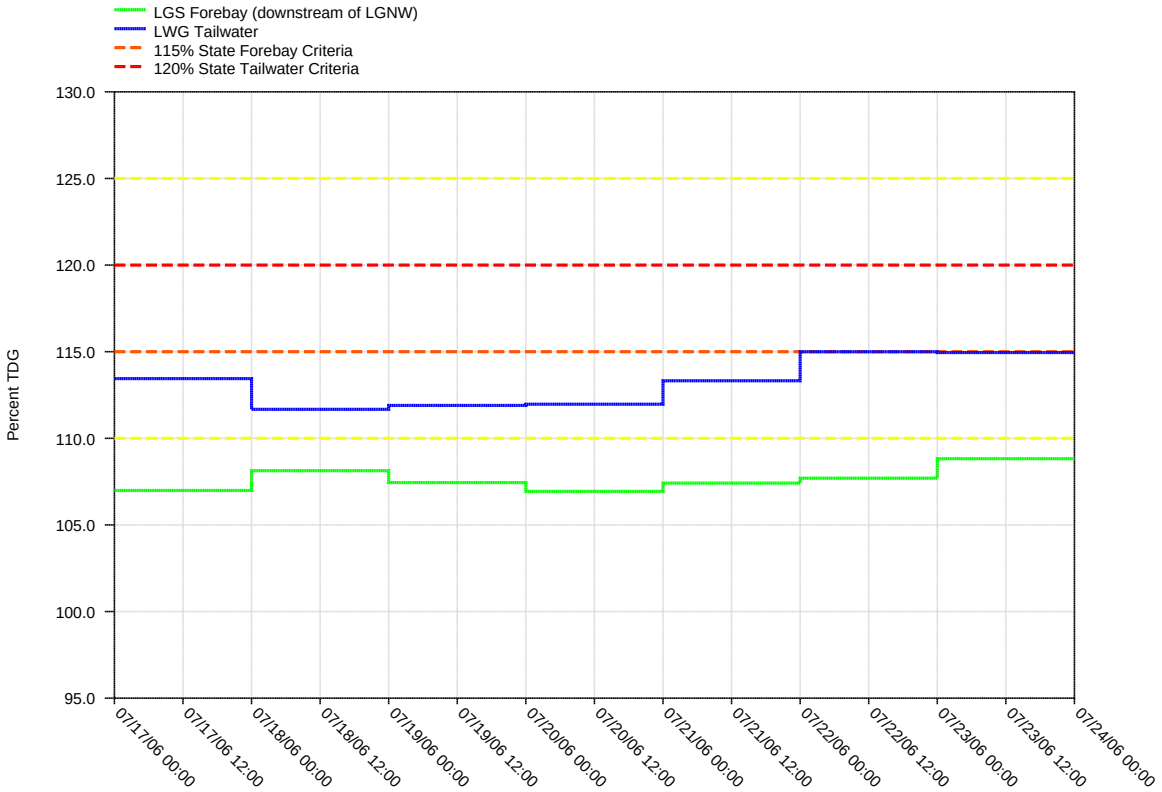


Figure 17.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

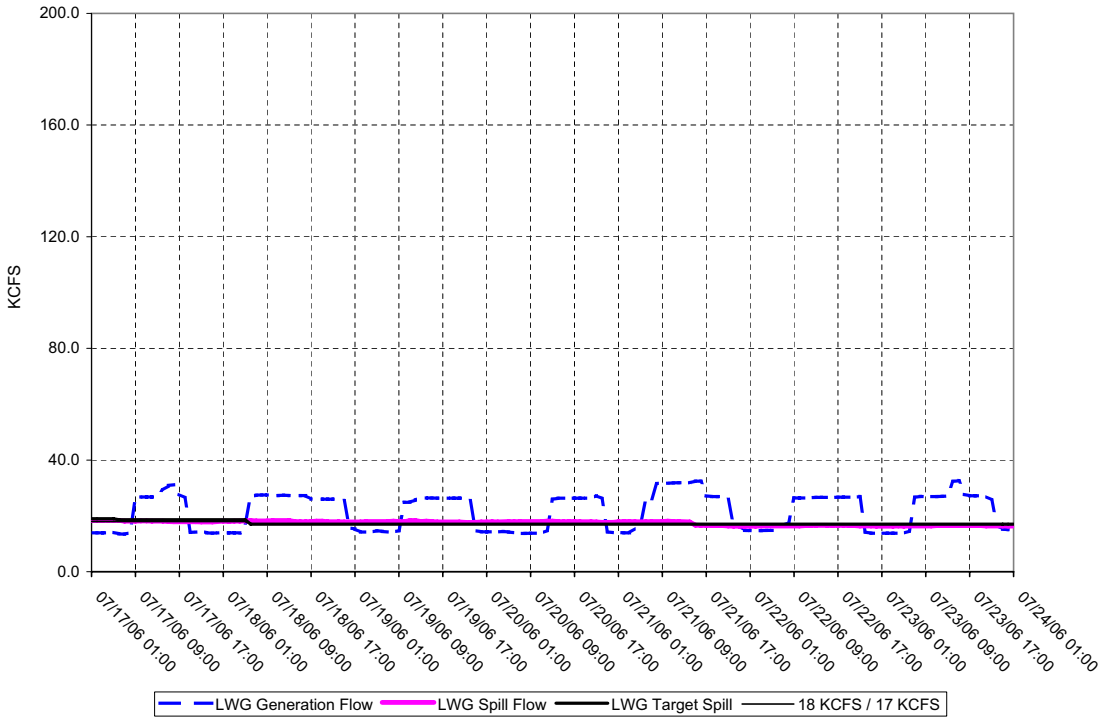
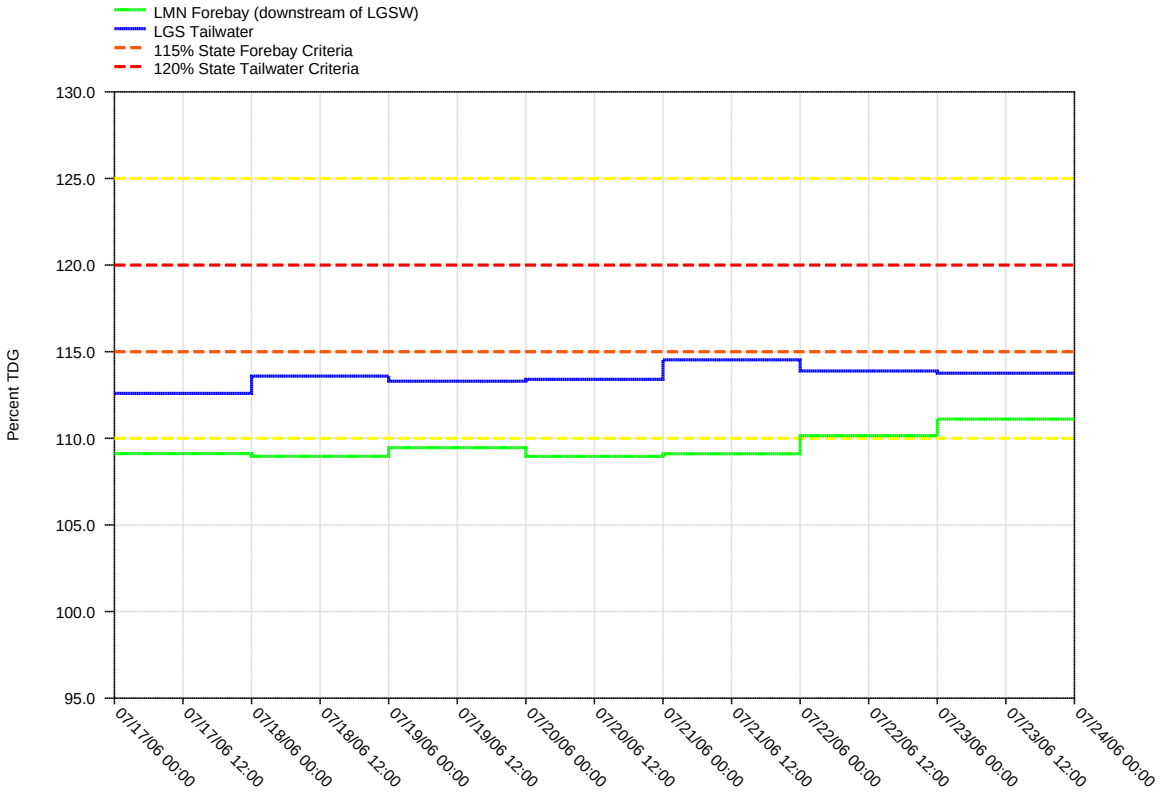


Figure 18.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

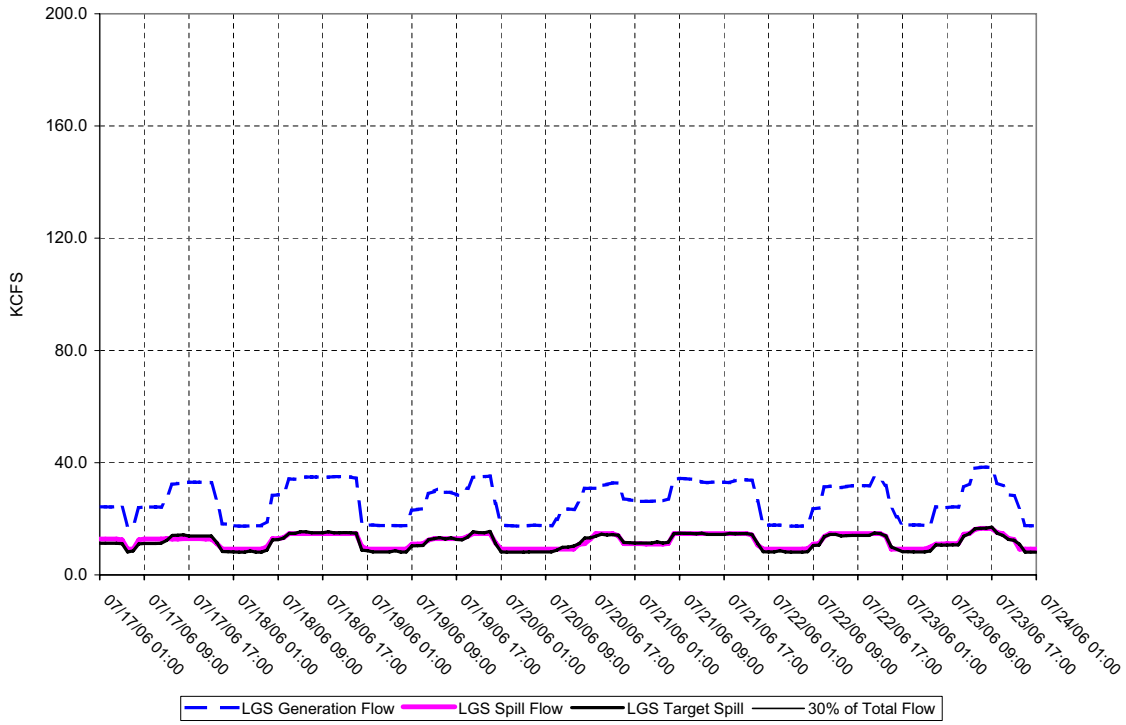
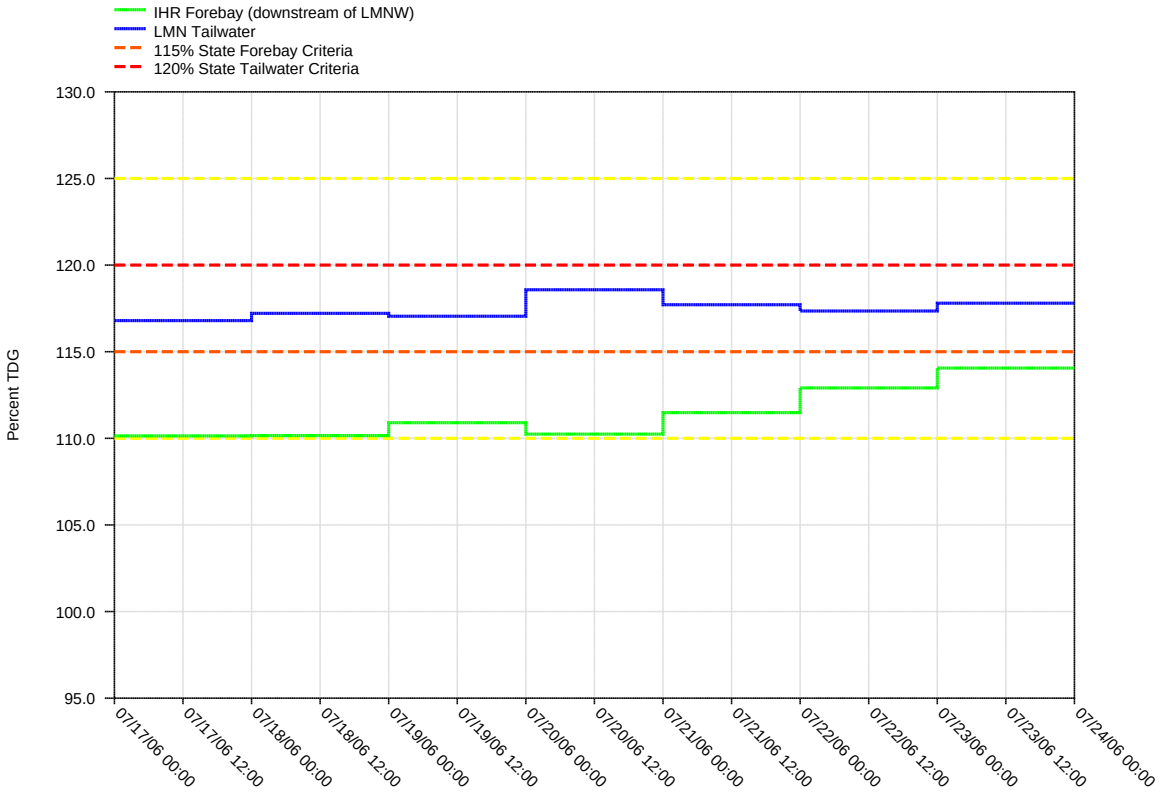


Figure 19.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

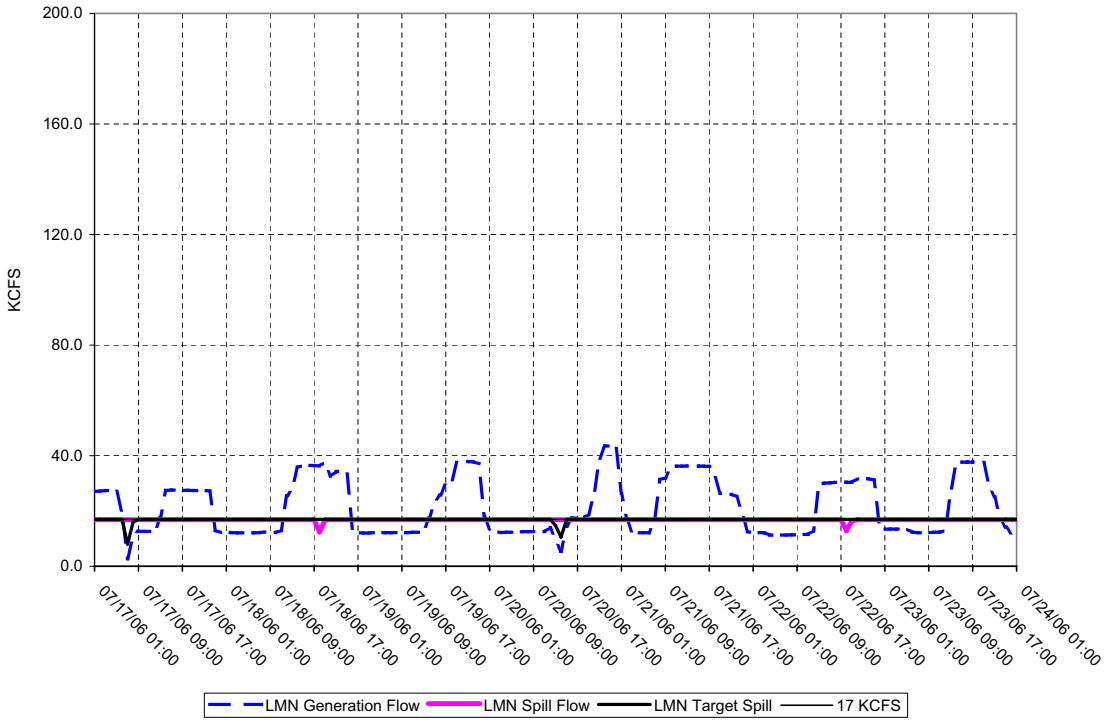
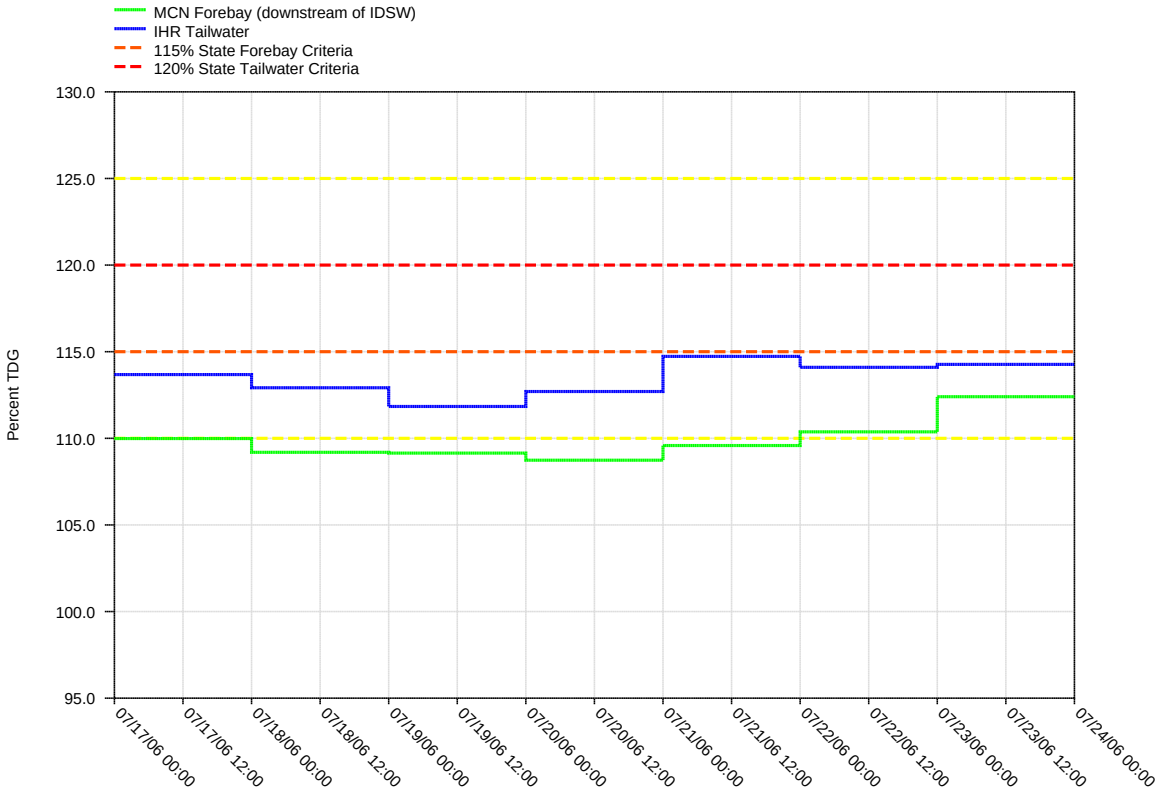


Figure 20.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

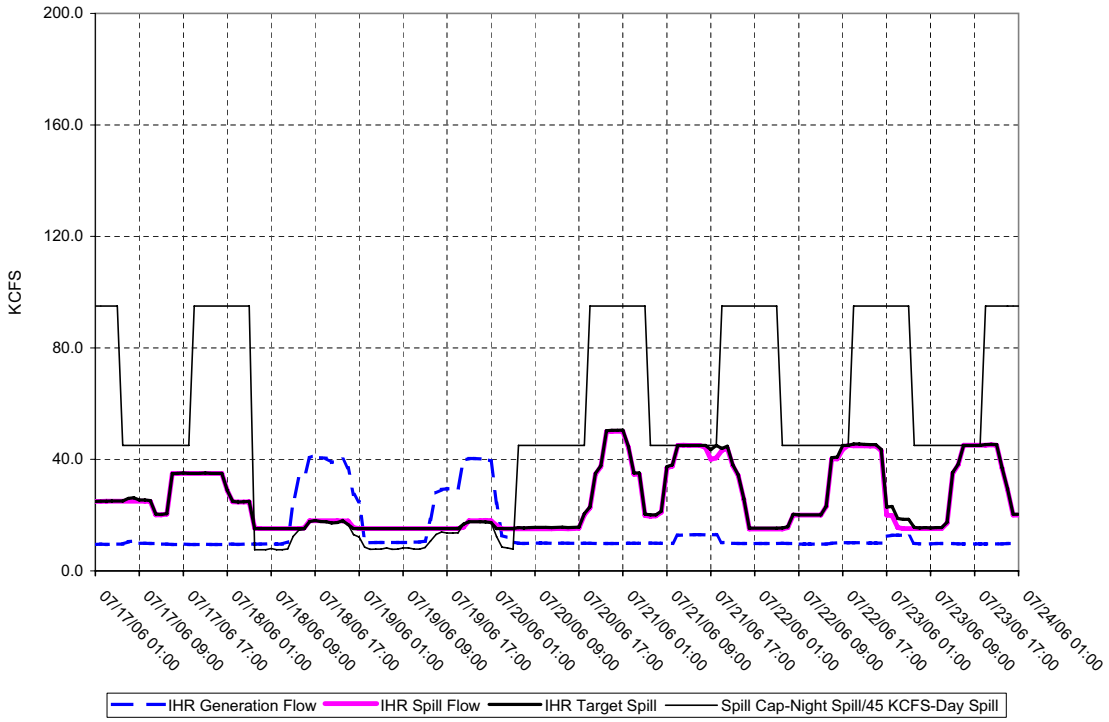
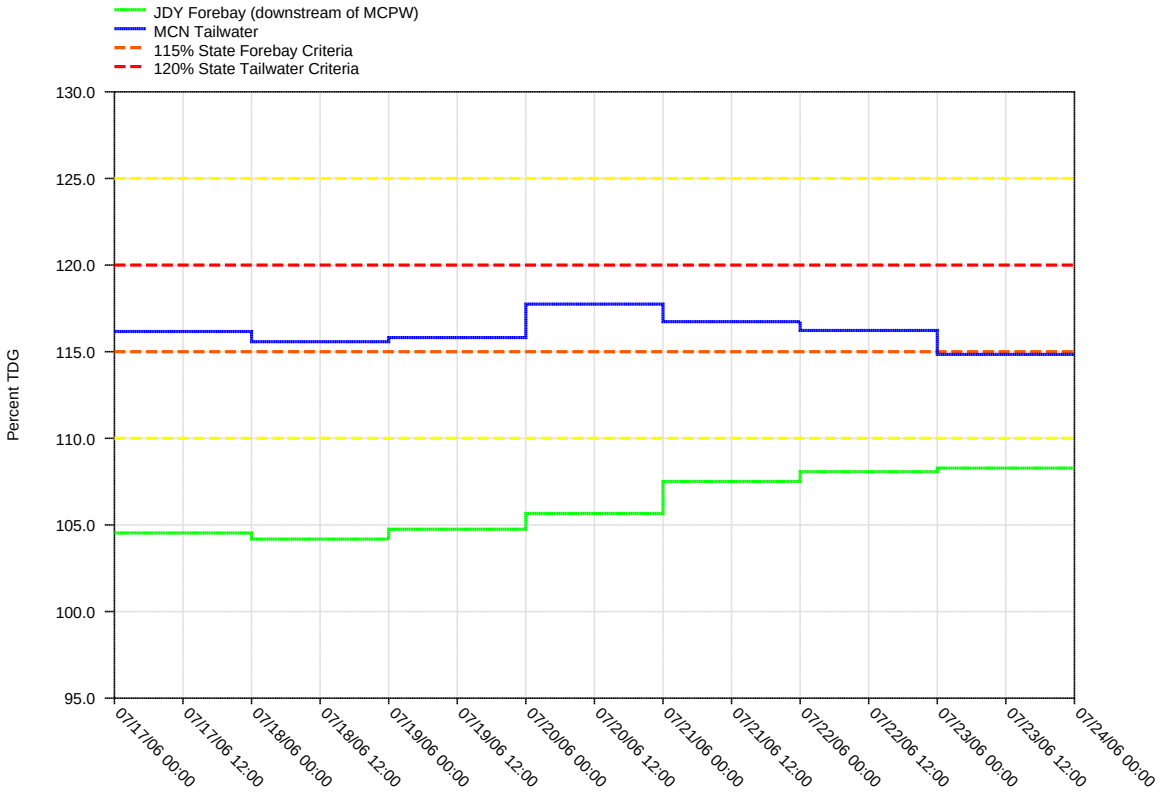


Figure 21.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

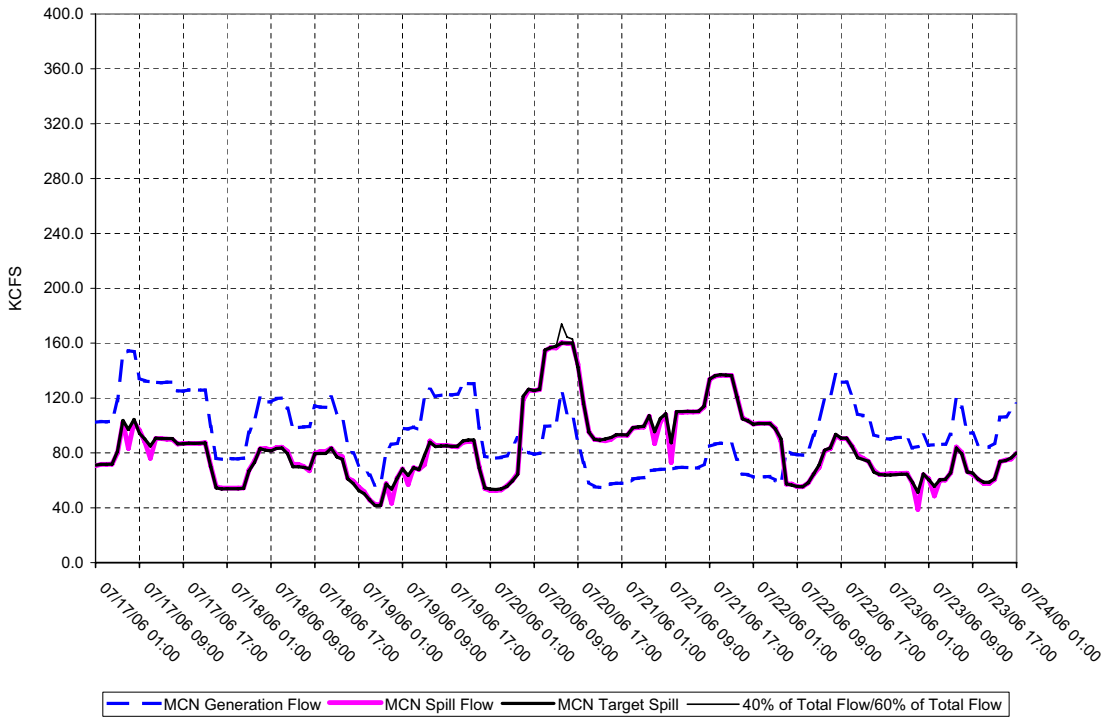
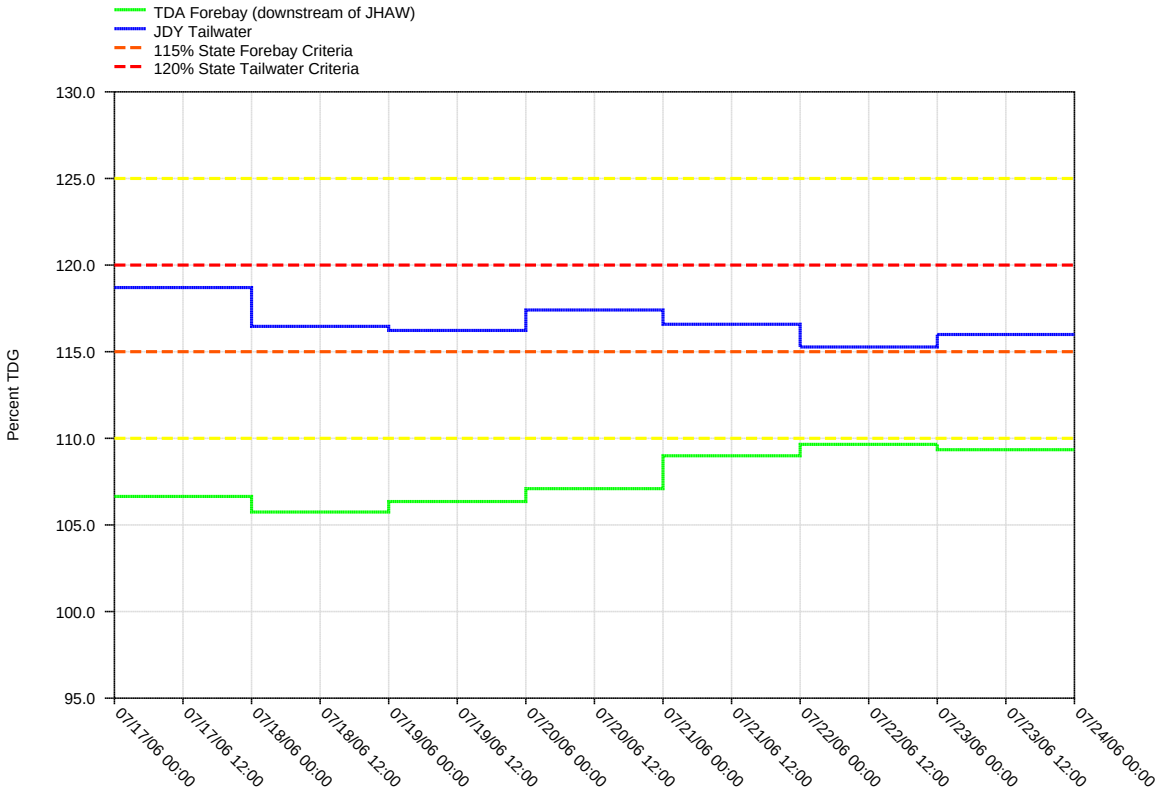


Figure 22.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

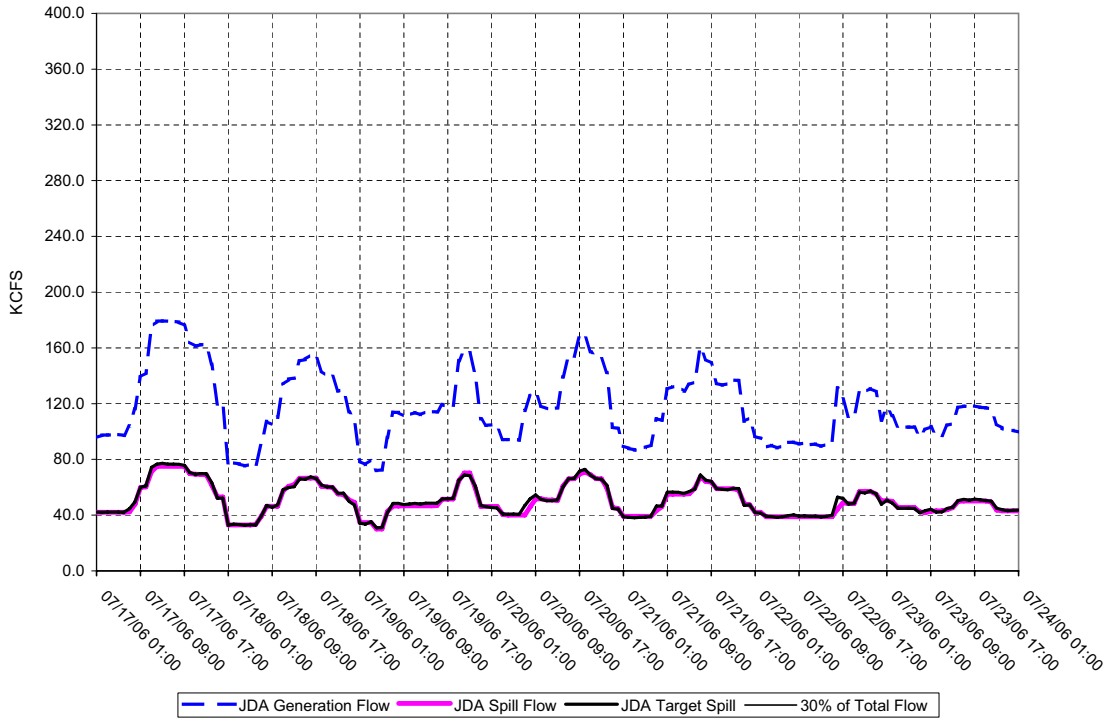
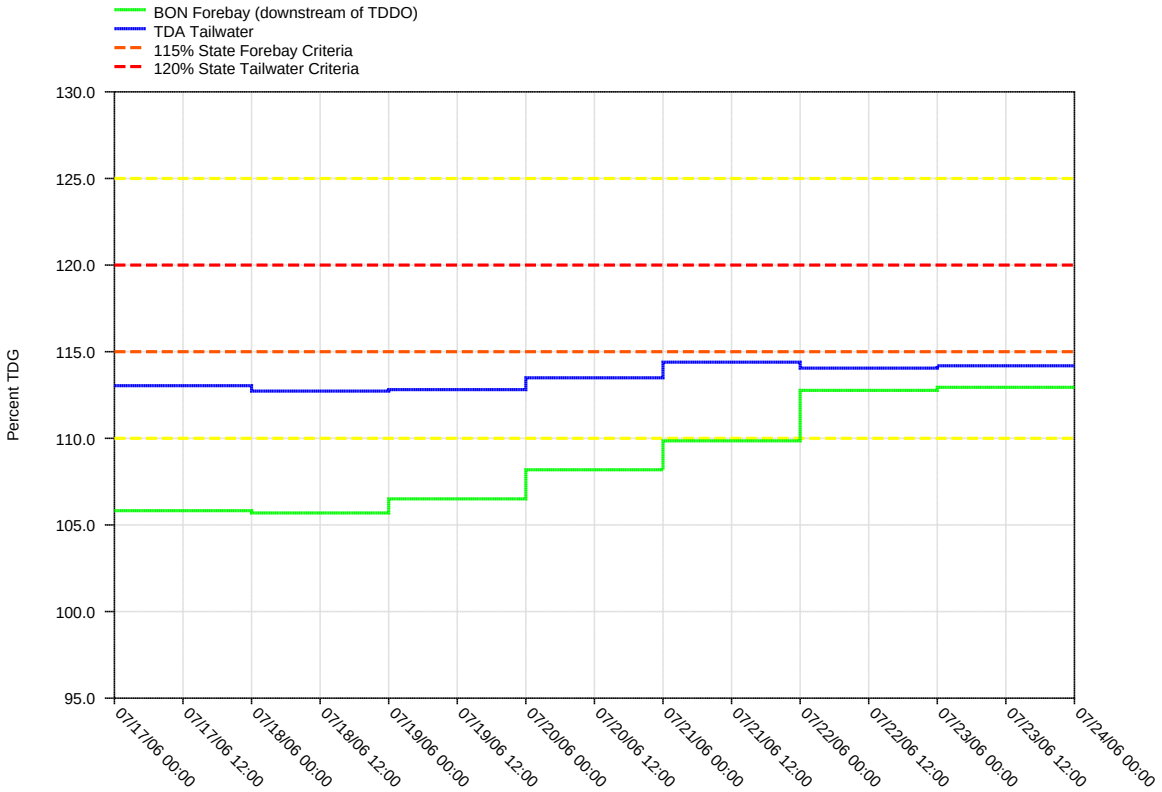


Figure 23.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

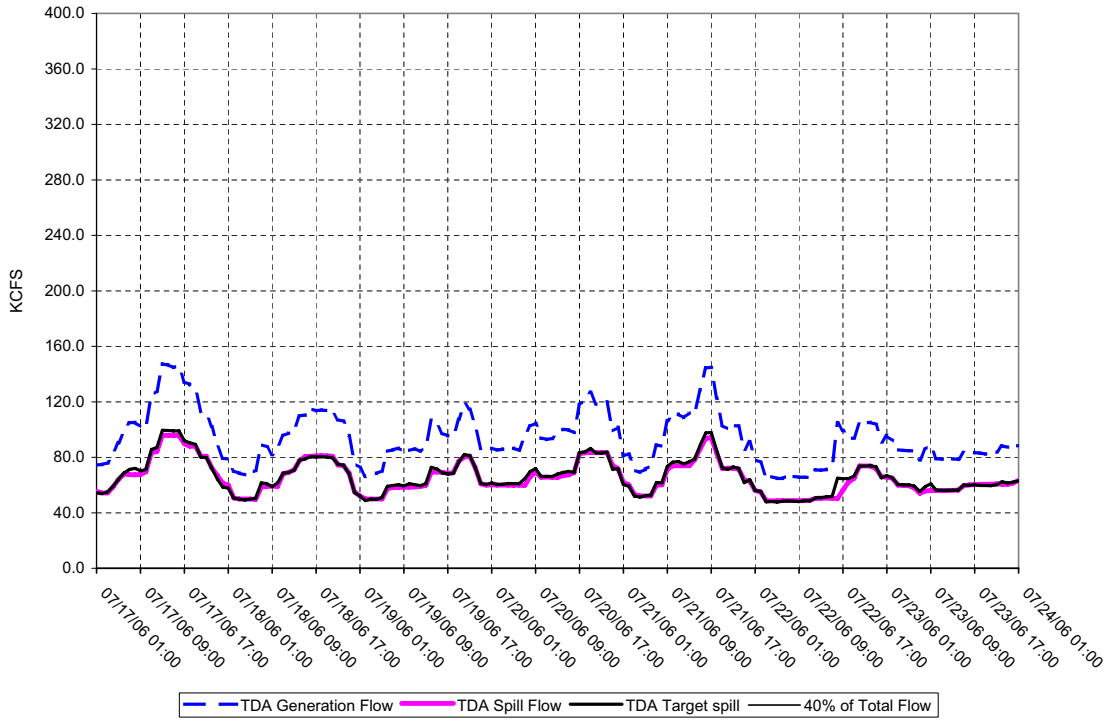
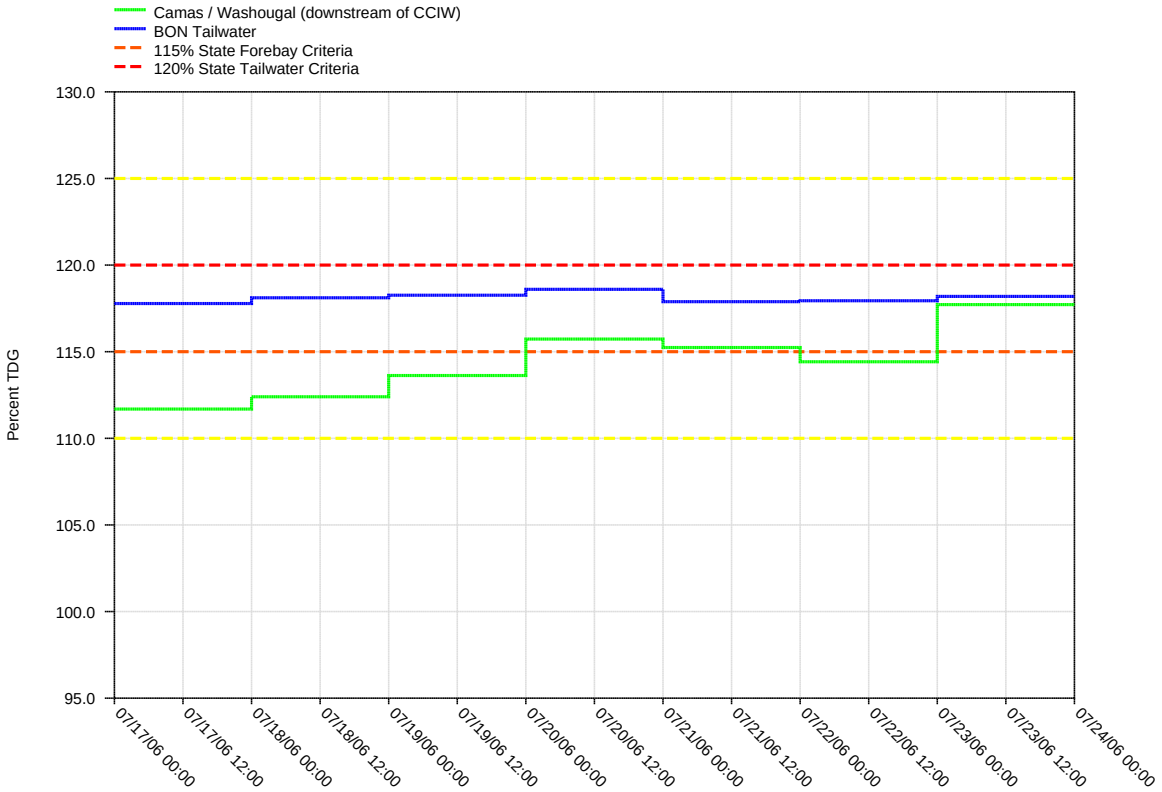


Figure 24.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

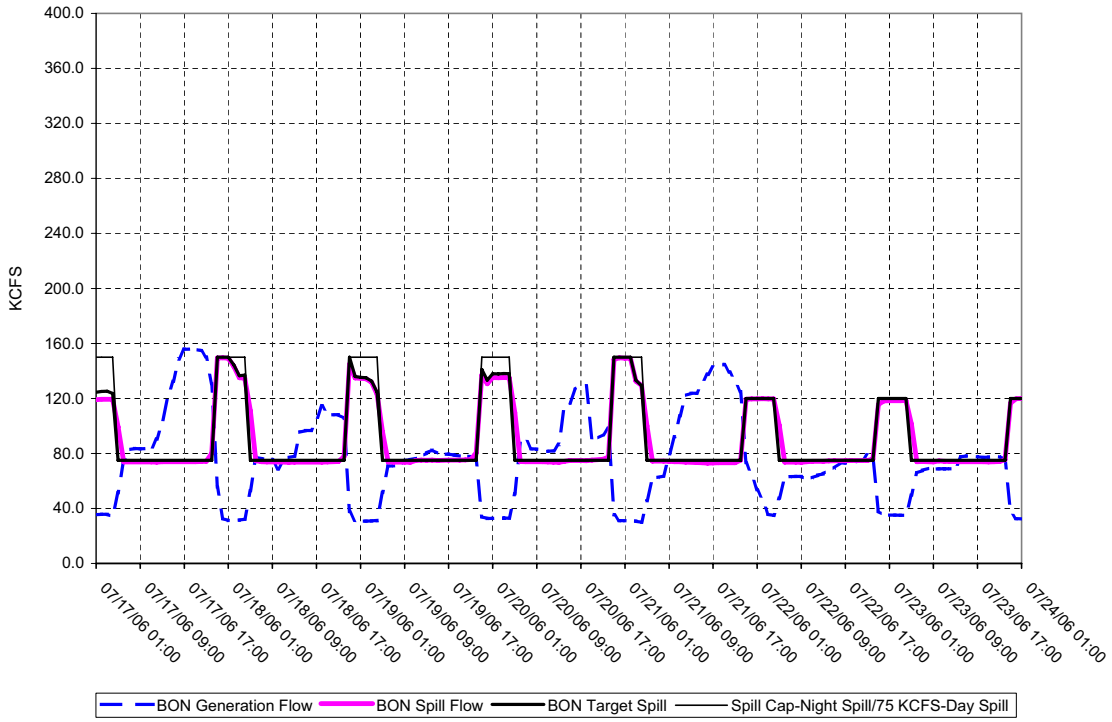
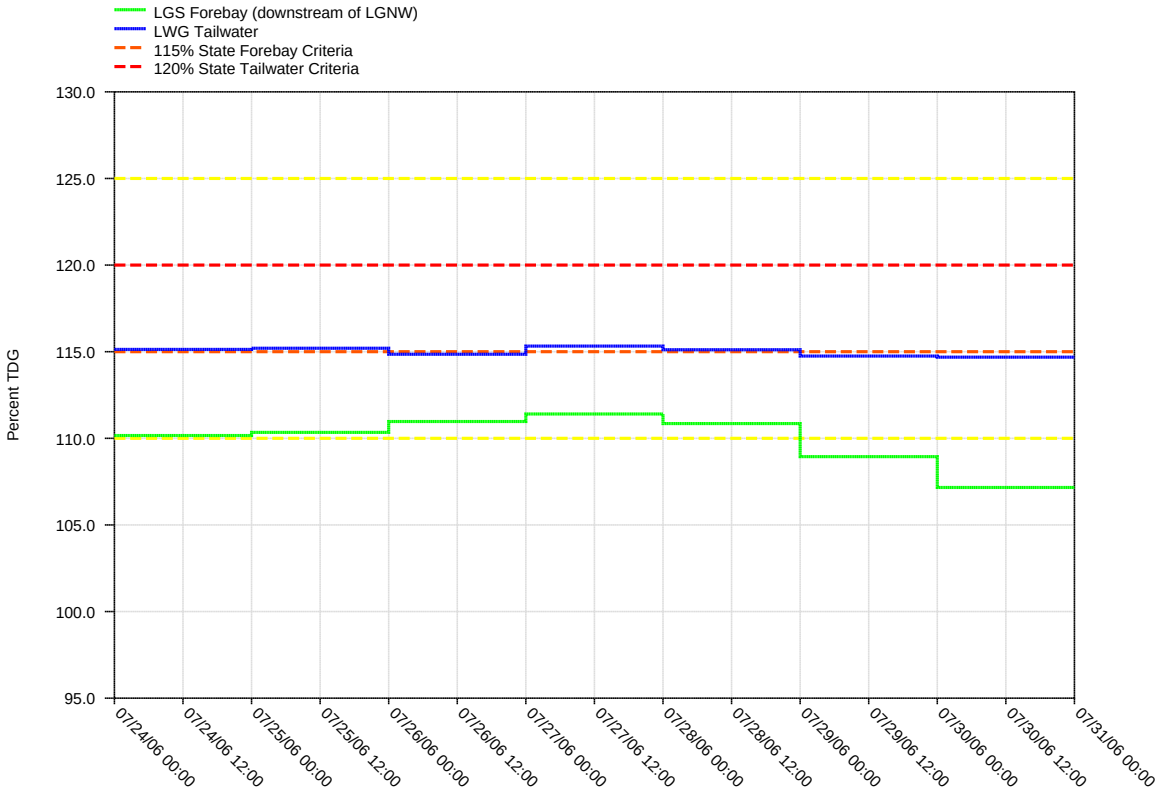


Figure 25.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

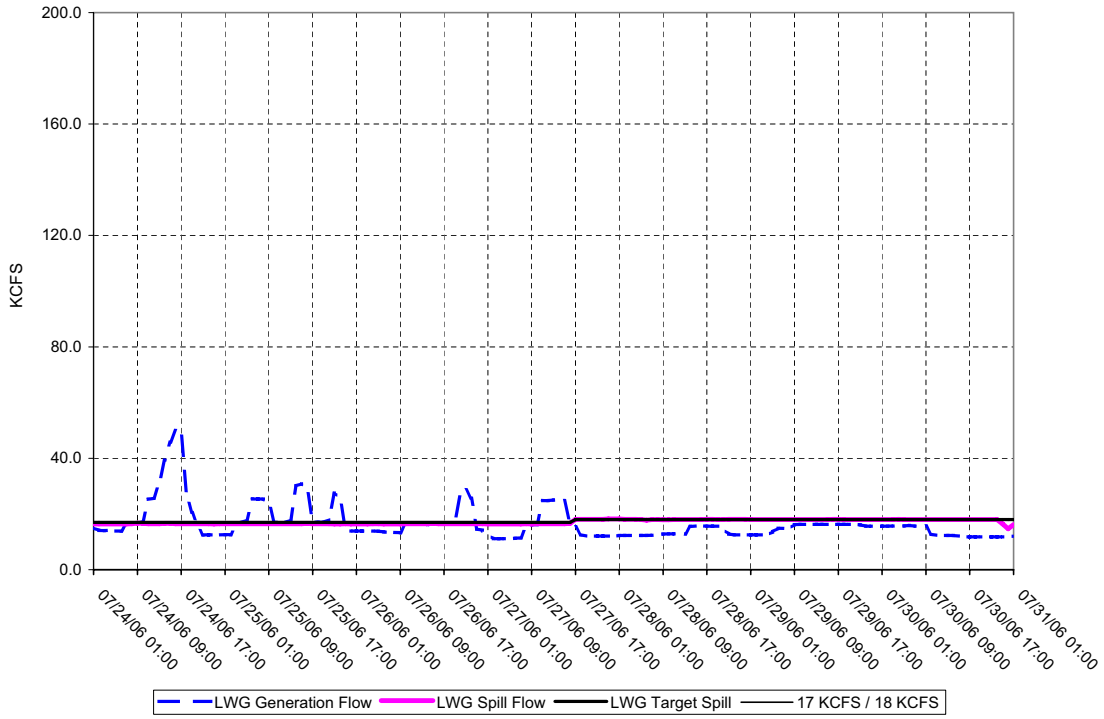
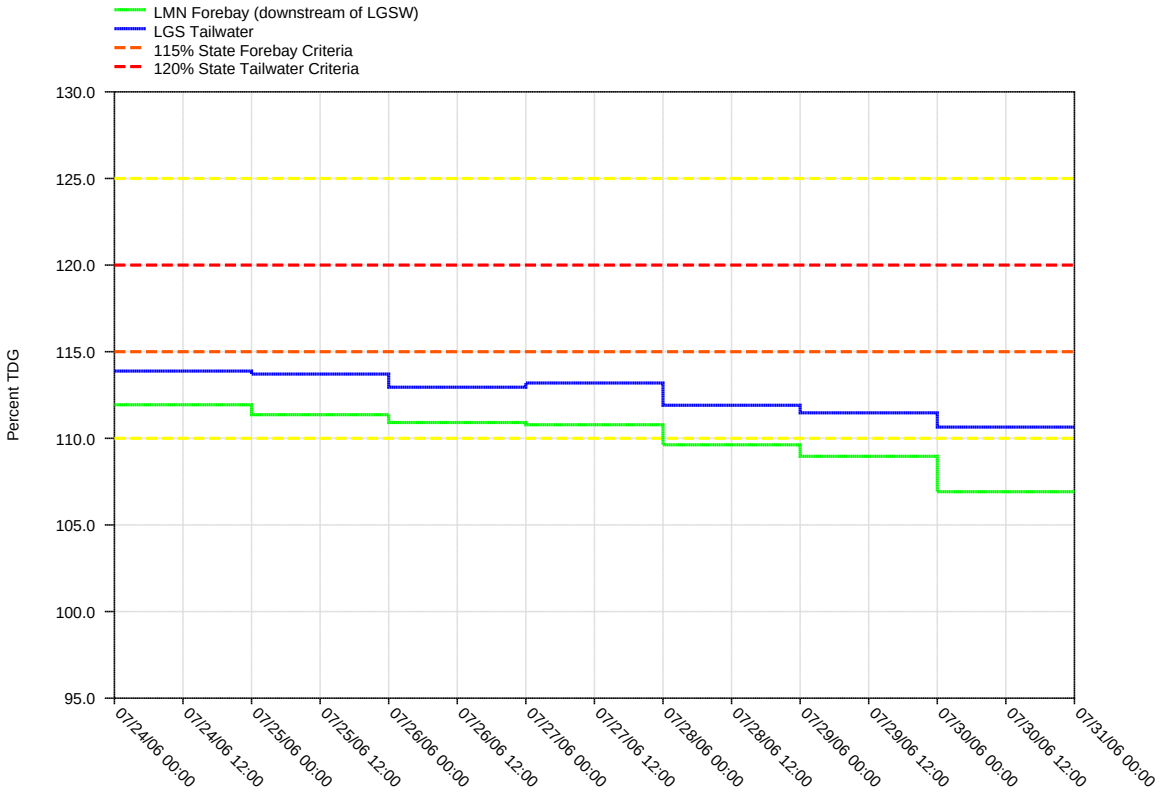


Figure 26.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

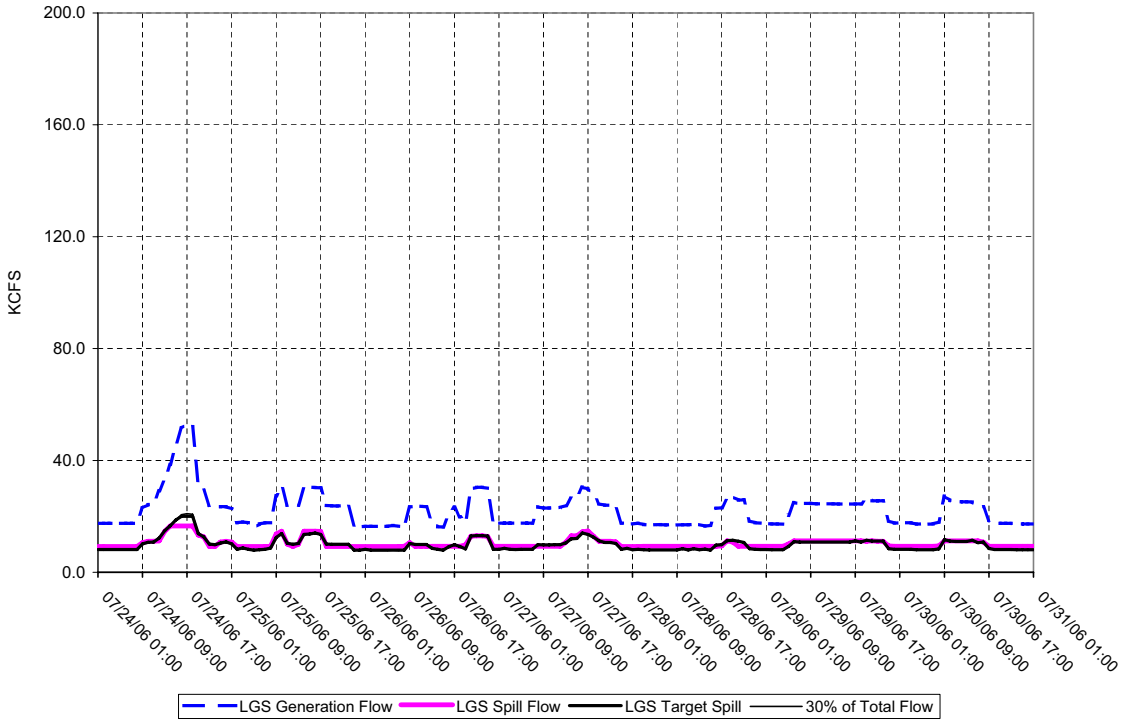
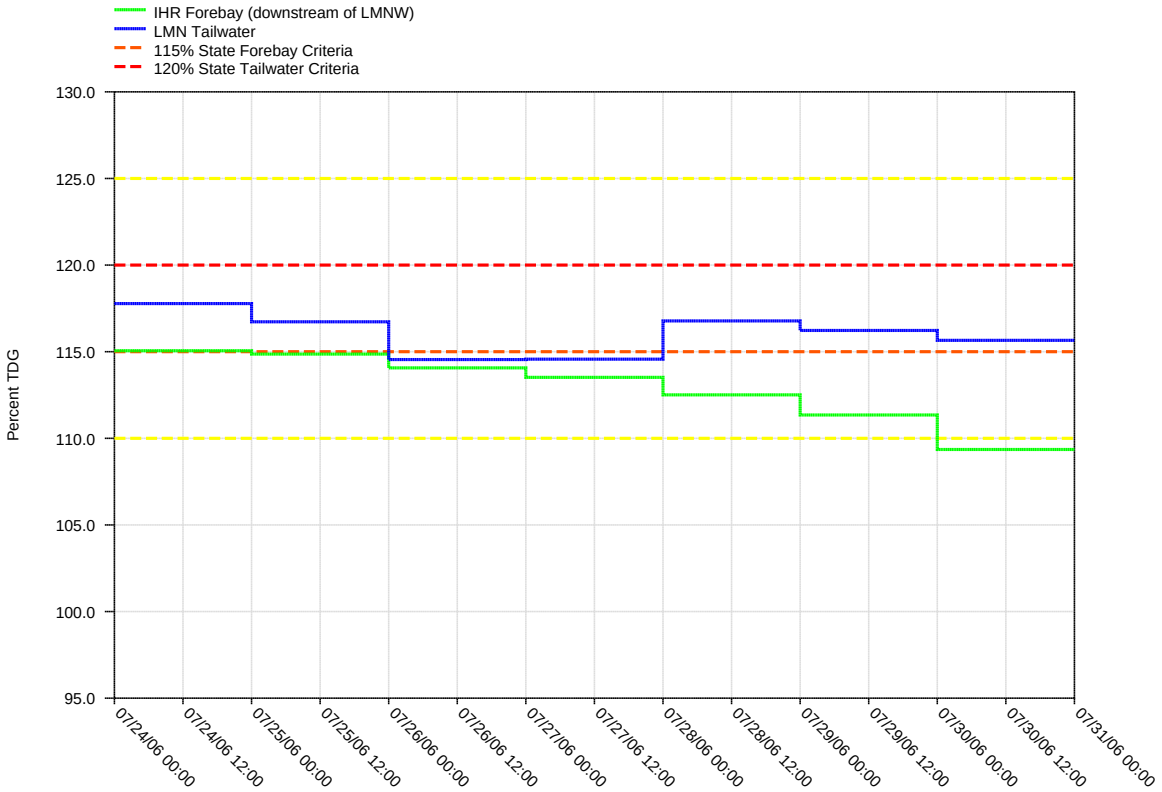


Figure 27.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

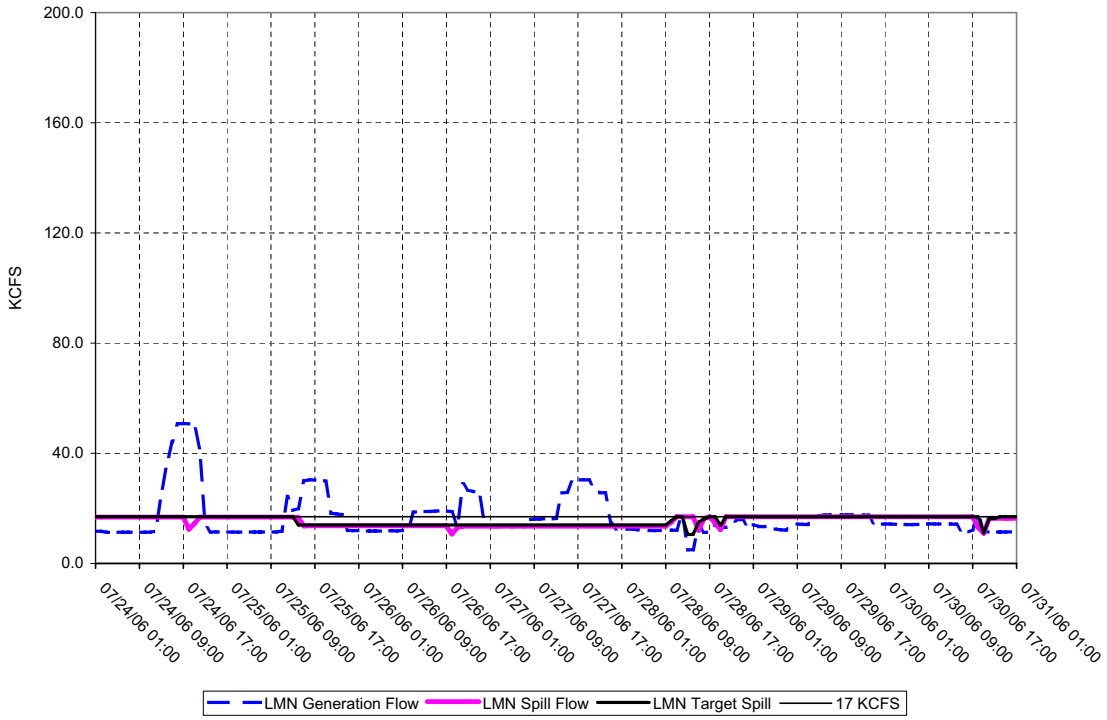
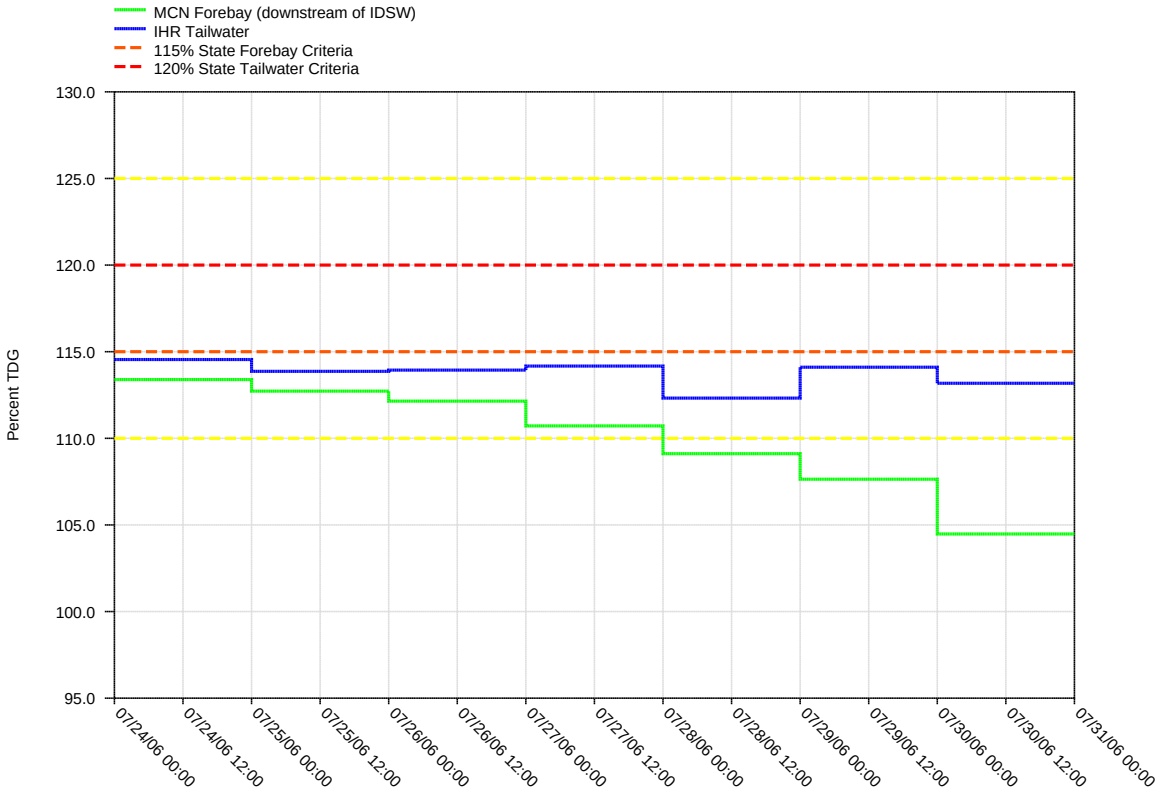


Figure 28.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

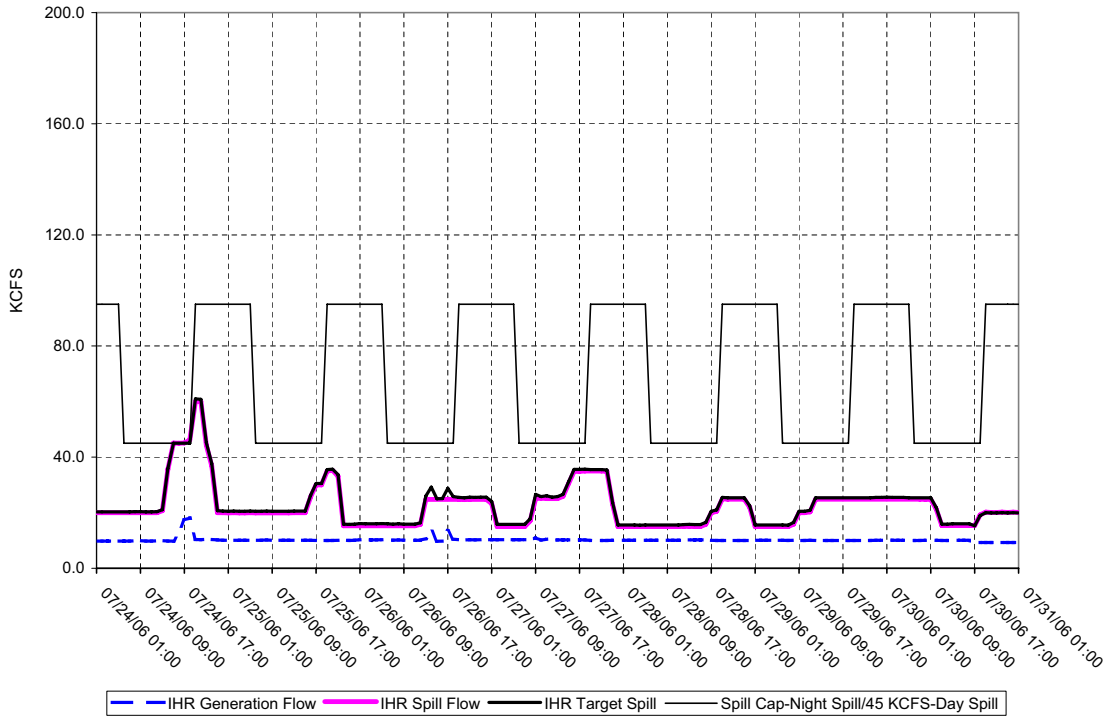
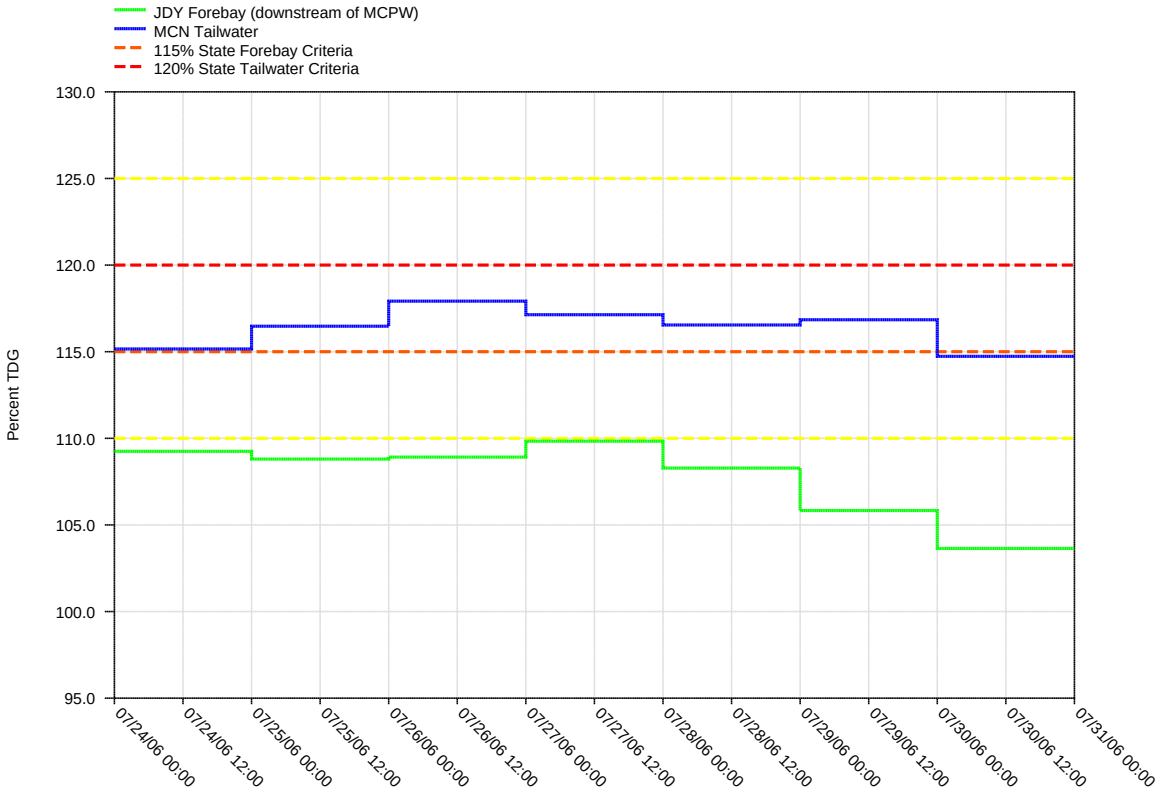


Figure 29.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

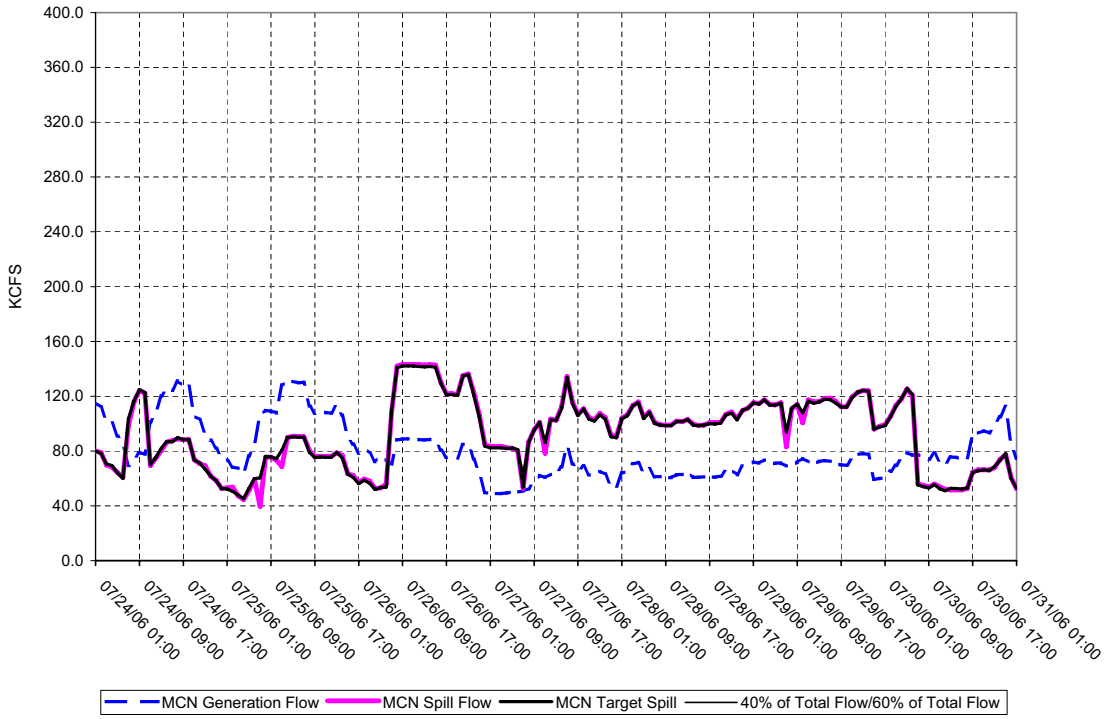
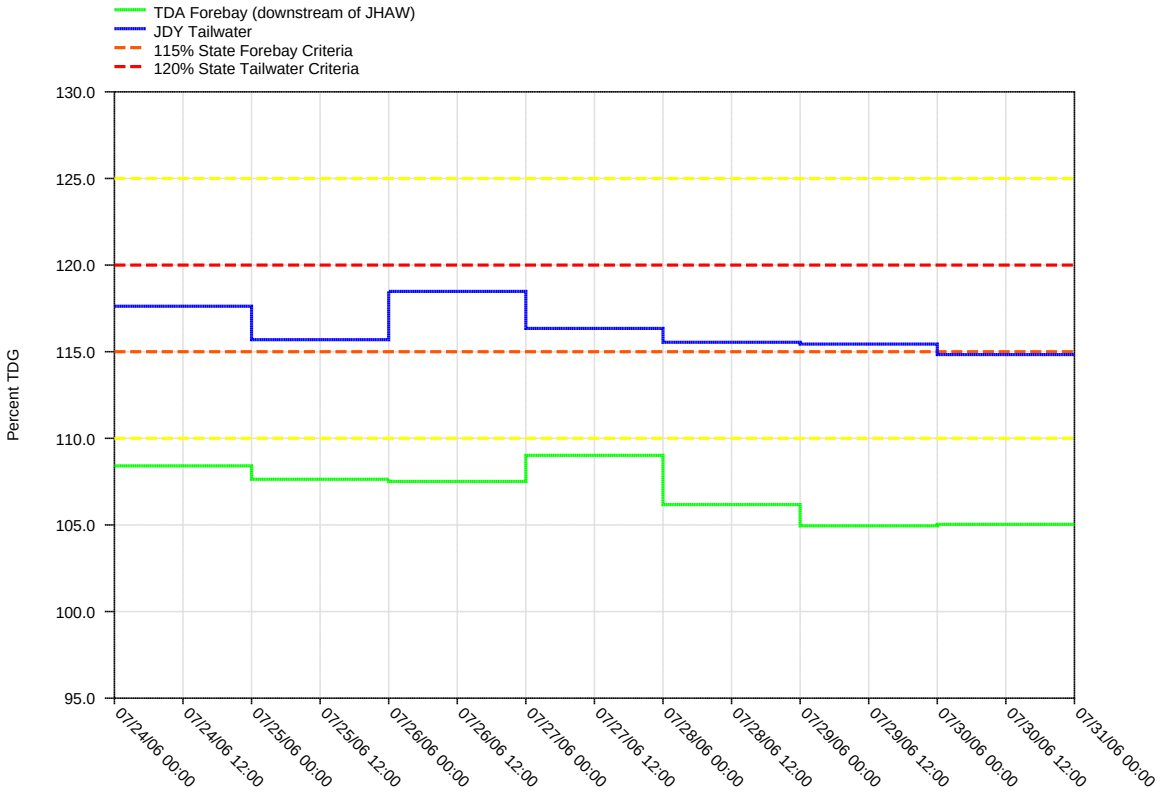


Figure 30.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

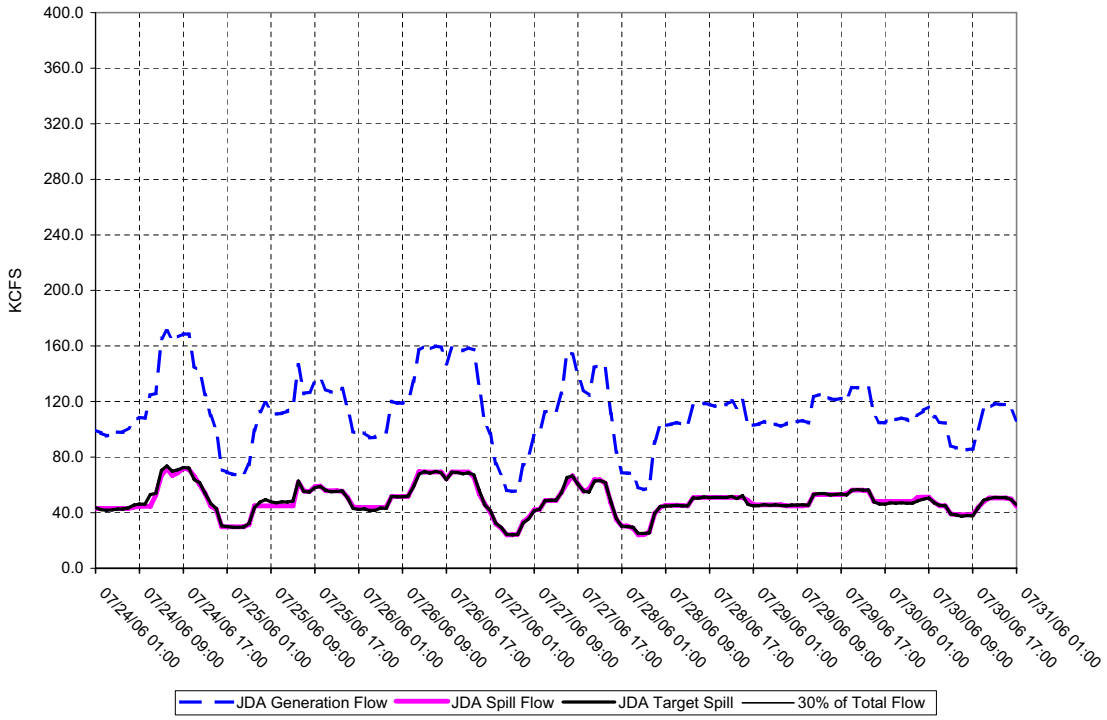
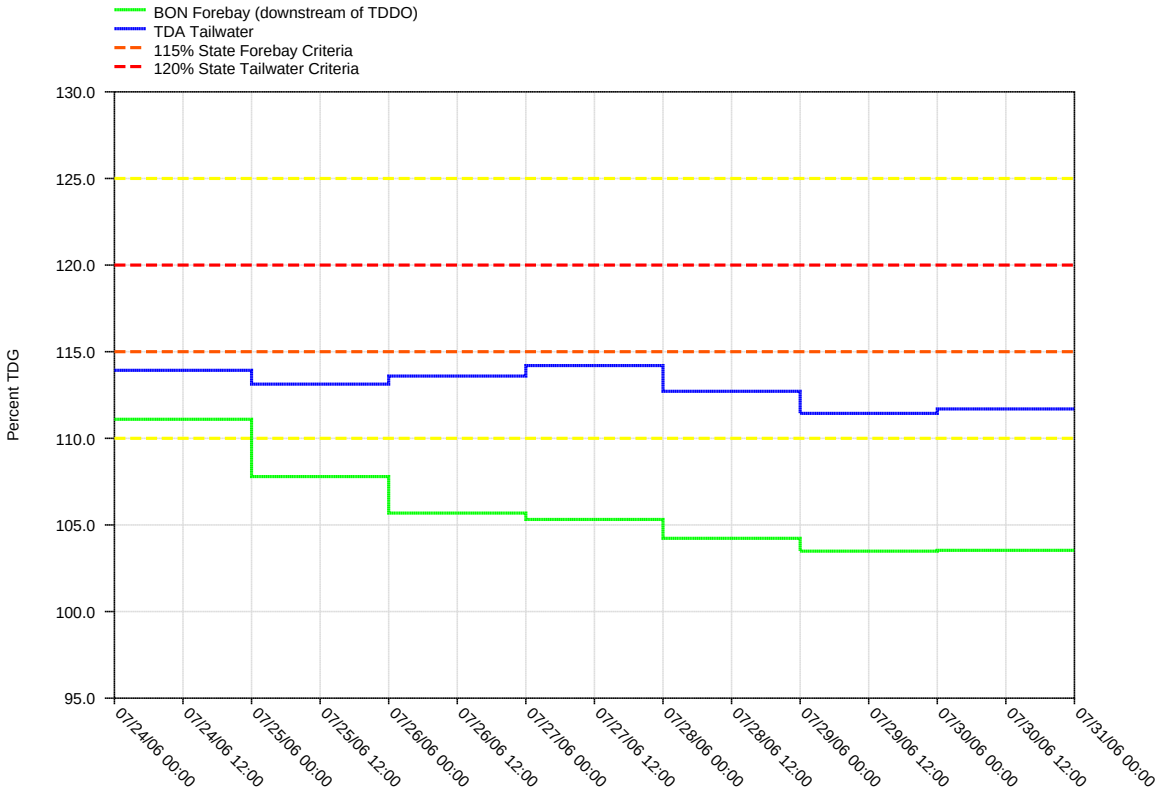


Figure 31.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

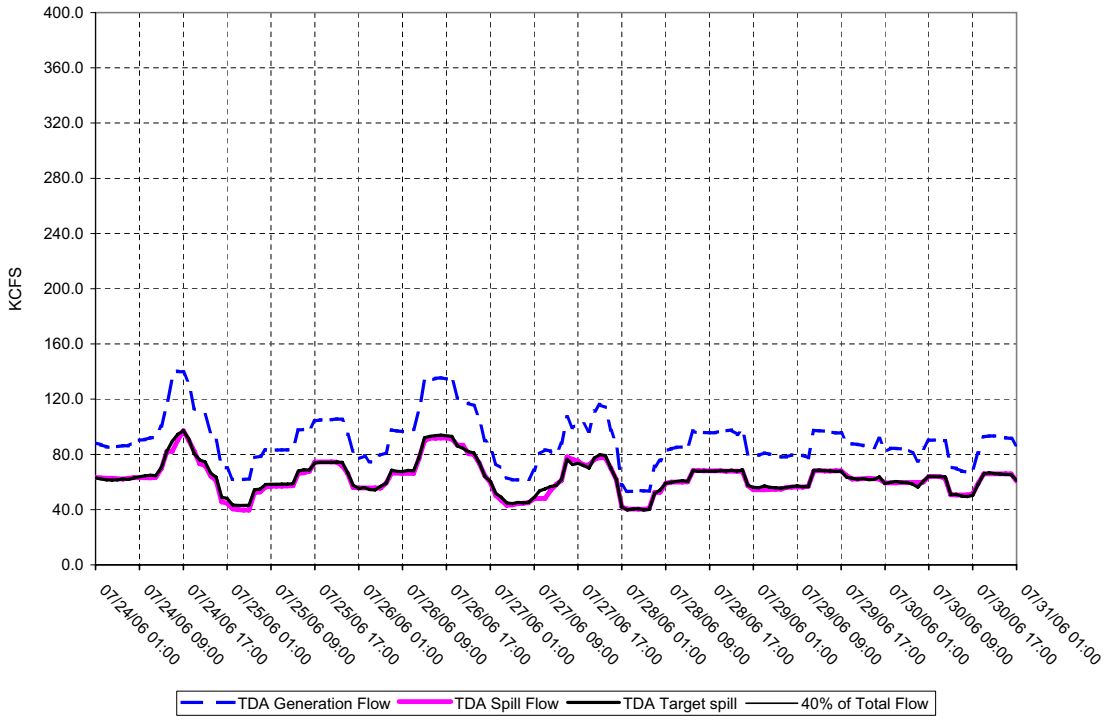
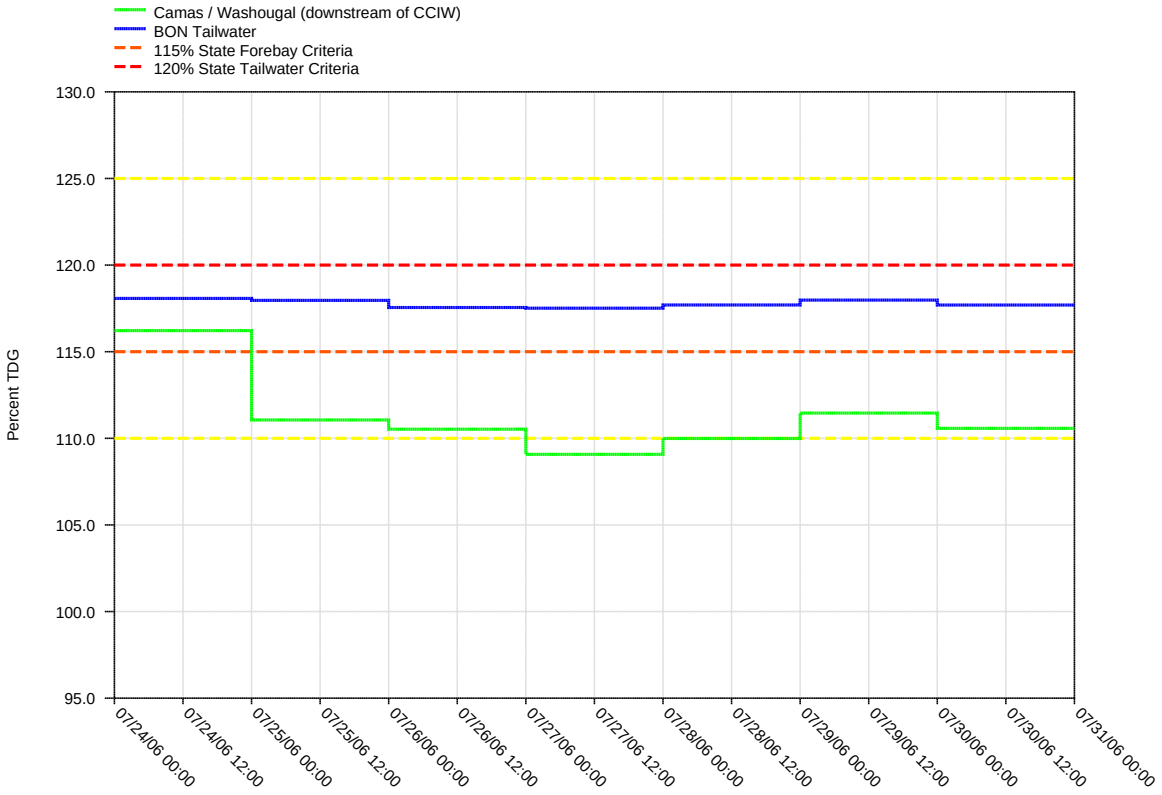


Figure 32.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

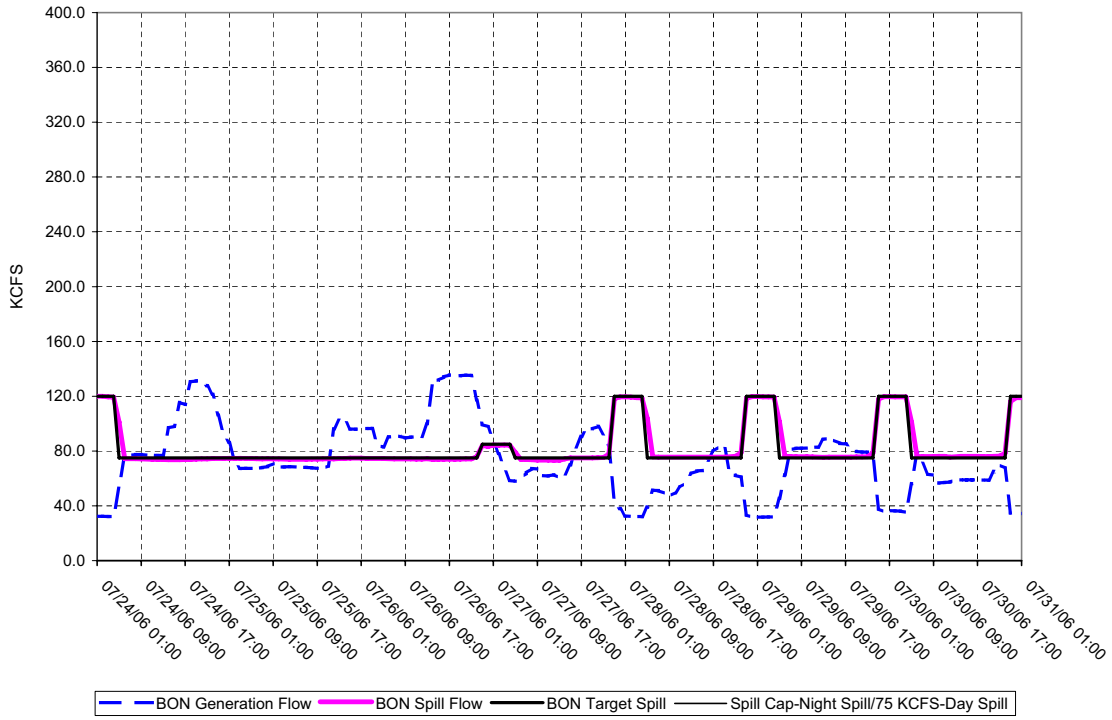


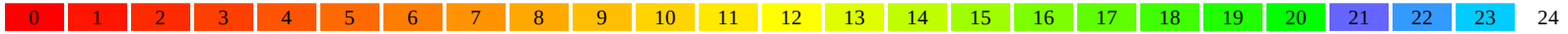
Table 1.

Average percent TDG for 12 highest hours - July 2006

Date	Monitoring Stations (full list)																
	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115
07/03/2006	103.1	114.1	113.1	115.0	113.7	115.8	114.0	113.0	112.7	116.8	112.5	116.3	110.4	115.8	110.3	115.7	112.3
07/04/2006	104.6	112.5	113.3	114.2	113.5	116.9	114.1	112.1	112.1	116.1	112.4	117.0	110.8	115.8	108.3	115.9	111.0
07/05/2006	105.5	114.1	112.1	119.4	113.1	118.5	113.7	114.7	111.8	116.7	111.7	117.9	109.4	114.9	106.7	116.9	110.1
07/06/2006	103.1	115.0	109.9	113.4	112.4	117.6	112.7	113.4	110.0	116.8	109.0	117.0	106.3	113.2	104.4	116.6	109.6
07/07/2006	101.1	112.8	108.7	113.8	110.1	117.8	110.3	115.3	106.9	116.0	106.5	119.2	107.5	114.4	105.7	116.4	111.7
07/08/2006	100.4	110.4	108.4	114.2	110.3	117.6	110.2	114.1	107.5	118.0	106.8	119.9	109.4	115.8	110.9	117.7	112.3
07/09/2006	101.1	114.4	108.5	115.5	111.3	118.0	111.0	111.8	110.1	117.8	107.3	119.1	109.5	115.6	112.4	117.6	114.2
07/10/2006	102.7	112.7	109.3	114.3	112.3	118.0	111.8	114.7	110.7	118.3	105.7	118.9	107.5	114.1	109.8	117.2	112.4
07/11/2006	104.2	113.6	109.5	114.9	112.0	118.6	112.9	114.8	110.2	118.3	105.3	119.6	106.6	113.8	107.7	118.2	112.3
07/12/2006	103.1	112.7	108.0	113.6	111.3	117.9	111.8	113.4	108.6	116.1	105.4	116.4	106.3	113.2	106.7	117.7	110.8
07/13/2006	102.2	114.3	106.7	113.2	108.5	117.2	109.4	112.7	106.8	115.2	105.7	117.3	107.3	114.0	108.0	117.8	113.7
07/14/2006	101.4	113.2	106.5	112.7	108.3	116.9	109.3	113.9	107.1	116.7	105.2	117.1	108.3	114.5	108.6	118.0	113.7
07/15/2006	100.9	114.2	106.7	114.0	108.1	117.3	109.0	114.6	108.0	119.0	104.5	116.0	107.2	113.2	107.6	118.5	112.9
07/16/2006	100.9	114.5	106.9	112.9	108.5	116.9	110.3	113.9	109.6	116.4	105.0	118.0	106.5	113.3	107.3	118.3	113.1
07/17/2006	101.7	113.4	107.0	112.6	109.1	116.8	110.1	113.7	110.0	116.2	104.5	118.7	106.6	113.0	105.8	117.8	111.7
07/18/2006	102.2	111.7	108.1	113.6	109.0	117.2	110.2	112.9	109.2	115.6	104.2	116.5	105.7	112.7	105.7	118.1	112.4
07/19/2006	102.4	111.9	107.4	113.3	109.5	117.0	110.9	111.8	109.1	115.8	104.8	116.2	106.4	112.8	106.5	118.3	113.6
07/20/2006	102.3	112.0	106.9	113.4	109.0	118.6	110.2	112.7	108.7	117.7	105.7	117.4	107.1	113.5	108.2	118.6	**115.7**
07/21/2006	101.9	113.3	107.4	114.5	109.1	117.7	111.5	114.7	109.6	116.7	107.5	116.6	109.0	114.4	109.9	117.9	**115.2**
07/22/2006	101.7	115.0	107.7	113.9	110.2	117.3	112.9	114.1	110.4	116.2	108.1	115.3	109.7	114.1	112.8	117.9	114.4
07/23/2006	103.3	115.0	108.8	113.8	111.1	117.8	114.1	114.3	112.4	114.8	108.3	116.0	109.3	114.2	112.9	118.2	**117.7**
07/24/2006	104.1	115.1	110.2	113.9	111.9	117.8	**115.1**	114.5	113.4	115.2	109.2	117.6	108.4	113.9	111.1	118.1	**116.2**
07/25/2006	104.5	115.2	110.3	113.7	111.4	116.7	114.9	113.9	112.7	116.5	108.8	115.7	107.6	113.1	107.8	118.0	111.1
07/26/2006	104.9	114.9	111.0	112.9	110.9	114.5	114.1	113.9	112.1	117.9	108.9	118.5	107.5	113.6	105.7	117.6	110.5
07/27/2006	105.5	115.3	111.4	113.2	110.8	114.6	113.5	114.2	110.7	117.1	109.8	116.3	109.0	114.2	105.3	117.5	109.1
07/28/2006	104.2	115.1	110.9	111.9	109.6	116.8	112.5	112.3	109.1	116.5	108.3	115.5	106.2	112.7	104.2	117.7	110.0
07/29/2006	103.1	114.7	108.9	111.5	109.0	116.2	111.3	114.1	107.6	116.8	105.8	115.4	104.9	111.4	103.5	118.0	111.5
07/30/2006	103.1	114.7	107.2	110.6	106.9	115.7	109.4	113.2	104.5	114.7	103.6	104.9	105.0	111.7	103.5	117.7	110.6

Generated: Mon Jul 31 15:25:00 2006

Number of hours of data reported in a given day



Big, bold, red text denotes exceedances.
--- indicates No Data
Dates run from hour 1 to 24 (not 0 to 23).
The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st.
At all other times, the gas cap is 110%.

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
WRNO	Bonneville Tailwater (Warrendale)
CWMW	Camas / Washougal

Effective April, 2006

FISH PASSAGE IMPLEMENTATION PLAN REPORT
August 2006

Submitted by the U.S. Army Corps of Engineers
Northwestern Division
Portland, OR

Introduction:

In accordance with the Court's instructions in the December 29, 2005 Opinion and Order, the U.S. Army Corps of Engineers (Corps) is providing the monthly report as described in the Fish Passage Implementation Plan (FPIP) submitted to the Court on April 3, 2006. The Corps' lower Columbia and Snake River project and fish passage operations for the month of August 2006 identified in the Order are contained in this report. In particular, information in this report includes the following:

- hourly flow through the powerhouse at each dam;
- hourly flow over the spillway compared to the spill target for that hour; and,
- resultant 12-hour average total dissolved gas (TDG) for the tailwater at each project and for the next project's forebay downstream.

This report also provides information on issues presented and unanticipated or emergency situations that arose during implementation of the spill program for the month of August 2006.

Data Reporting:

I. For each project providing fish passage operations, this report contains two graphs per week in August displaying the progress of the spill program as follows:

(A). Daily Average of the High 12 Hourly % Total Dissolved Gas (TDG) Values - described in the upper graph.
(B). Hourly Spill and Generation Flows – described in the lower graph.

The weekly graphs begin on July 31 and end on August 31 for the following Lower Snake and Lower Columbia River projects: Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville Dams.

Each figure represents one week of operation for a project, except for the last week of August which includes only four days. The graphs reflect Monday 0100 hours through Monday 0100 hours (except the last week graphs run through Friday 0100) for the following dates:

July 31 – August 7	Figures 1 - 8
August 7 – August 14	Figures 9 - 16
August 14– August 21	Figures 17 - 24
August 21 – August 28	Figures 25 – 32
August 28 – September 1	Figures 33 – 40

A. Upper Graph: Shows the resultant daily average percent TDG for the 12 highest hours as the result of spill from the dam. The objective is to operate each project up to the TDG limits without exceeding those limits if possible.

- The blue line on the graph represents the TDG in the tailrace of the dam. 120% TDG is the upper operating limit
- The green line represents the TDG in the forebay of the next dam downstream. 115% is the upper operating limit.

B. Lower Graph: Represents the flow and spill at the dam.

- The dotted blue line shows the flow through the powerhouse each hour, in thousand cubic feet per second (kcfs).
- The heavy red line represents the hourly flow through the spillway in kcfs.
- The thin black line represents the project spill levels shown in the spring and summer spill tables in the 2006 FPIP (pages 1 – 2).
- Each graph includes a heavy black line that represents the target spill. This is the hourly spill level as defined in the 2006 FPIP. This maximum spill level is subject to the following conditions:
  - Spill percentage or discharge specified in the FPIP;
  - Spill caps as set daily for TDG management;
  - Test spill levels for fish passage research; and,
  - Minimum generation for power system needs.

  The hourly target spill may vary as a function of quantity of river flow and generating units available at a project.

II. A monthly table (Table 1) is included at the end of the report that shows the overall daily results of the average percent TDG for the 12 highest hours for all projects. The numbers in red show exceedances of the TDG gas cap - 115% (forebay) or 120% (tailwater) for each project.

Operations:

During the August reporting period, the projects provided summer spill and fish passage operations in accordance with the FPIP. Transported juvenile fish were barged every other day until August 15 at Lower Granite, Little Goose, Lower Monumental, and McNary dams and were trucked beginning August 17. At all the projects, the summer spill season ended on September 1 at 0001 hours in accordance with the FPIP.

As noted in the FPIP (page 3), "[s]pill below the specified levels could occur during low runoff conditions when meeting minimum generation levels at a project requires reducing spill volumes." Inflows in August, as expected, continued to recede naturally across the Columbia Basin. Brief periods when spill was below the level described in the FPIP can be seen on the graphs where the heavy red line dips below the heavy black line. When the operation varied below the target spill, or other alterations occurred, explanations are included in the variance table below.

Due to low flows, on August 10 a teletype was sent to the Snake River projects (excluding

Little Goose which is 30% spill of project outflow) instructing them to spill the remaining project outflow after minimum generation was achieved, up to the spill cap. Some of the Snake River projects operated above or below the minimum generation values stated in the FPIP to stay within the 1% peak efficiency range, as described below.

The Corps identified minimum generation flows in the FPIP, which were derived from the turbine tables published in the Fish Passage Plan (FPP). The reported minimum generation levels were 11.5 kcfs at Lower Granite, Little Goose, and Lower Monumental dams, and 9.5 kcfs at Ice Harbor Dam. However, these figures are approximations and do not account for varying head or other small adjustments that may result in variations in the reported minimum generation flow and spill amount. Conditions that lead to minor variations include:

1. Varying pool elevation; as reservoirs fluctuate within the MOP or MOP + 1 operating range, flow rates through the generating unit change.
2. Generating unit governor "dead band"; the governor controls the number of megawatts the unit should generate. The governor cannot perfectly control a unit; variations can be +/- 1% or 2% of generation.
3. System disturbances; once the generator is online and connected to the grid, it responds to changes in system voltage and frequency. These changes may cause the unit to increase flow and generation slightly within an hour.
4. Individual units may behave slightly differently or have unit specific constraints.
5. The Automatic Generation Control system regulates MW generation only - not flow through turbines.

In August 2006, the observed minimum generation outflow at the low end of the 1% peak efficiency range for Lower Granite, Little Goose, and Lower Monumental dams varied between 11.0 and 12.0 kcfs. At Ice Harbor Dam, the minimum generation outflow at the low end of the 1% peak efficiency range varied between 8.3 and 10.0 kcfs.

The following describes the August spill operation at each project: Lower Granite and Lower Monumental dams provided 18 and 17 kcfs spill, respectively, for approximately half of August due to low flow conditions and meeting the minimum generation range of 11.0 to 12.0 kcfs. At Little Goose Dam, 30% of the total flow was spilled except on August 16 when there was a spike in spill due to reduced generation while a unit was out of service for one hour. Ice Harbor Dam was not able to vary spill from daytime to nighttime as described in the FPIP due to the low flows; instead the project spilled the remaining outflow after minimum generation was met. At McNary Dam, the target spill alternated between 40% and 60% of total flow every two days as stated in the modification described in the July Spill Implementation Report, page 4. John Day Dam spilled 30% of total flow and The Dalles Dam spilled 40% of total flow. Target spill at Bonneville Dam varied from daytime to nighttime as described in the FPIP and is shown as the heavy black line on the graph. The target spill and actual spill at Bonneville Dam fell below the spill cap for a total of 18 nights due to low flow conditions and providing for minimum generation.

The following describes operational adjustments made through the Regional Forum process for August 2006:

1. Juvenile fish transportation operations were carried out concurrent with spill at the projects, in accordance with the FPIP and criteria in the FPP. Transport at lower Snake River collector projects continued through August, with the last transport barge leaving Lower

Granite Dam on August 15. Truck transport started on August 17 from Lower Granite, Little Goose, Lower Monumental and McNary Dams. The Corps plans to continue truck transport every other day until the end of September at Lower Monumental and McNary Dams, and until the end of October at Lower Granite and Little Goose Dams.

2. The Columbia River Towboat Association submitted a System Operating Request (SOR 2006-NAV-02) to address safe navigation concerns for vessel traffic at Lower Monumental Dam on August 8. This SOR recommended modified spill for the period of time it takes a vessel to enter or depart the lock, which is approximately twenty minutes. The SOR was discussed at TMT, which supported the Corps' plan to explore alternative spill patterns to provide both safe navigation and fish migration for the near and long term through the Fish Passage Operation and Maintenance (FPOM) team. FPOM met on August 16 and developed several alternative spill patterns for lockage only and requested that the dam operators return to the patterns developed through the Regional Forum or in the FPP after lockage. This modification was coordinated through the TMT and FPOM and implemented on August 16.

3. Generally Lower Snake River projects operated at minimum operating pool (MOP). However some modification to reservoir elevations occurred as follows:
   - Ice Harbor transitioned from elevation 437 feet to 438 feet in response to a navigation safety concern in the Lower Monumental tailrace. This operation was coordinated through the TMT and implemented on August 3. Once the navigation safety concern was examined and the Corps determined it was appropriate, Ice Harbor returned to elevation 437 feet on August 18.
   - Little Goose Dam operated through August at elevation 634 to 635 feet to alleviate navigation problems at the Lower Granite navigation lock. This operation began on July 24-25, as described in the July monthly report.

5. Libby and Hungry Horse summer operations: Beginning July 25, the Corps and Reclamation reduced outflow from Libby and Hungry Horse dams consistent with the agreement reached through the Regional Forum. Libby Dam reduced outflow from 17 to 14 kcfs, with outflows varying as the reservoir lowered. At Hungry Horse the outflow was reduced from about 5.4 kcfs to about 3.0 kcfs beginning July 26-27. TMT met on August 30 and recommended ramping down Libby Dam outflows to 9 kcfs, in accordance with the U.S. Fish and Wildlife Service 2006 BiOp ramping rates, starting on the evening of August 31, and holding at this level through September. Actual September operations will depend on lake elevation and power needs.

Variances from target spill and other anomalies in the graphs
August 2006 Spill Season

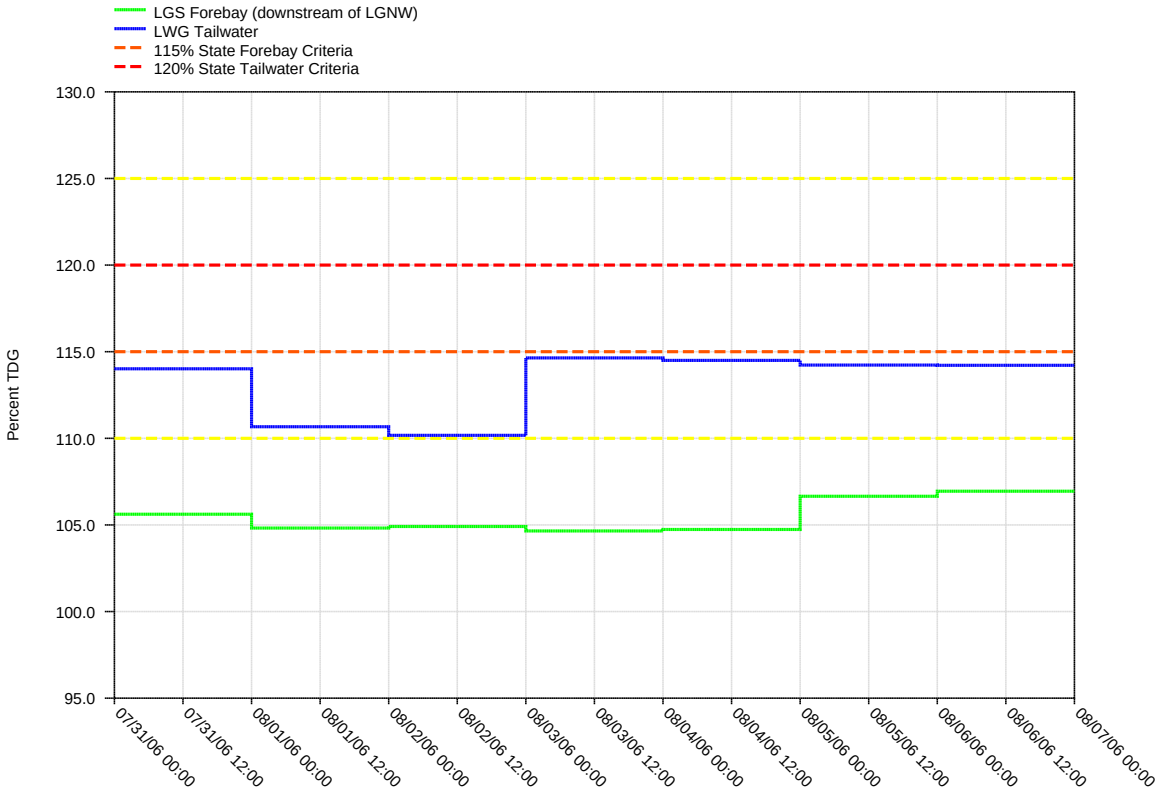
Project	Parameter	Date	Time	Reason
Lower Granite	Generation & spill	8/3/06 – 8/9/06	All day	BPA load requests for more generation effected spill and generation. Inflows to LWG varied by 10 kcfs due to Hells Canyon discharge shaping and BPA worked to maintain forebay elevation.
Lower Granite	Generation & spill	8/4/06 – 8/5/06	2200-600	Project generated 12.4 to 12.5 kcfs. (11.0 – 12.0 kcfs is the normal range of flexibility for the small units.) The computer GDACS control system does not allow generation of less than 12.5 kcfs.
Lower Granite	Generation & spill	8/8/06	200 - 600	BPA load requests resulted in 12.4 – 12.5 kcfs discharge. (11.0 – 12.0 kcfs is the normal range of flexibility). Forebay elevations were being managed given the need to shape inflows in excess of available storage.
Lower Granite	Generation & spill	8/28/06 8/31/06	700 1800	The powerhouse was off line during a repair. The turbines ran at speed no load to provide power to the project, and the remaining flow was spilled.
Little Goose	Generation & spill	8/16/06	2400	The project was switching transformers, which required a line to go out of service. One unit operated at speed no load for one hour to provide power to the project and the remaining flow was spilled.
Little Goose	Generation & spill	8/20/06	400 - 700	The project spilled more than 30% and the daily spill average was 31.2%, due to an increase in outflow because the forebay elevation was near its upper limit.
Lower Monumental	Generation & spill	8/3/06	1600 - 2000	BPA load requests for more generation effected spill and generation. The project generated 12.5 – 17.4 kcfs and spilled 14.7 – 16.9 kcfs. Inflows were being managed for the Little Goose operation and forebay restrictions while also passing water to fill the Ice Harbor forebay.
Lower Monumental	Generation & spill	8/4/06	400 – 700 900	BPA load requests resulted in 12.7 – 13.1 kcfs discharge. (11.0 – 12.0 kcfs is the normal range of flexibility) There was a line outage scheduled so spill was being managed to address the forebay elevation restriction and planned outage.
Lower Monumental	Spill	8/7/06 8/9/06	1800 – 2000 1800 - 2000	Project reduced spill to allow safe movement of fish barges in the loading area.
Lower Monumental	Spill	8/9/06 – 8/10/06	1200 – 1800 100 - 1400	BPA load requests resulted in 12.1 – 12.4 kcfs discharge. (11 - 12 kcfs is the

				normal range of flexibility). Spill was provided at the closest setting (16.8-16.9) to approach 17 kcfs.
Lower Monumental	Spill	8/10/06 – 8/12/06	2300 - 700	Spill exceeded the FPIP level of 17 kcfs. The Corps teletype sent Aug 10 asked the project to do minimum generation of kcfs and spill the rest. This resulted in spill levels between 17.5 and 21.5 kcfs.
Lower Monumental	Spill	8/12/06 8/13/06	2400 400 & 1800	The project generated at minimum generation of 11- 12 kcfs and spilled the rest. Because of very low flows, spill for these hours were especially low.
Lower Monumental	Spill	8/15/06 – 8/16/06 8/17/06 8/20/06	2100 – 1300 2000 – 2400 900 - 2400	The project was generating 11.4 - 11.6 kcfs and spilled the rest, up to the spill cap of 25 kcfs. This exceeded the FPIP level of 17 kcfs spill.
Lower Monumental	Spill	8/29/06	2300 - 2400	BPA load requests resulted in 15.9 – 13.3 kcfs discharge. (11.0 – 12.0 kcfs is the normal range of flexibility). This resulted in 3.9 – 1.3 kcfs less spill.
Ice Harbor	Spill	8/1/06	2000 - 2100	The project generated at minimum generation of 9.9 kcfs; however, spill dropped due to low flows.
Ice Harbor	Spill	8/29/06	1000 - 1100	The project generated 11.2 and 10.9 kcfs. (8.2 – 10.0 kcfs is the normal range of flexibility). As a result, spill was 1.2 to .9 kcfs less.
McNary	Spill	8/8/06 8/10/06 8/12/06	700, 1000, & 1400 700, 1000-1100 900 & 1100	The project reduced spill to allow safe movement of the fish barges in loading area.
McNary	Spill	8/11/06	1400 & 1700	BPA varied its load requests to meet power demand and the project was on automatic control. Project spilled an average of 39.3%.
McNary	Spill	8/12/06	600 - 700 & 1100	The project reduced spill to allow safe movement of the fish barges in loading area.
The Dalles	Generation & spill	8/14/06	400 – 1100	BPA load requests for more generation effected spill and generation. The project reported spill was 39.0% as a daily average with the actual spill was 39.6% (see explanation in following row).
The Dalles	Spill	8/14/06	900 – 1000	Data shown was incorrect: Project operator reported 36.4 kcfs at 9:00 and 38.1 kcfs at 10:00, which resulted in a calculated value of 39.0% daily average spill; however, operator later verbally reported an actual spill of 44 kcfs (not shown in graphics) resulting in a 39.6% daily average spill. The operator did not change spill volumes on the GDACS system to reflect actual spill those hours.
Bonneville	Generation &	7/31/06 – 8/2/06	400 - 500	BPA loads requests resulted in greater than minimum generation during the

	spill	8/17/06	1600 – 2100	daytime; as a consequence, the spill cap was not reached at night (2100 – 500).
Bonneville	Generation & spill	8/22/06 – 8/24/06 8/27/06 - – 9/1/06 0000	1200 – 500 2030 - 500	Tribal treaty fishing was underway, and the project was operating within a narrow forebay range for the fishery. It was necessary to generate more to keep the pool elevation somewhat stable, which resulted in less spill at night.

Figure 1.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

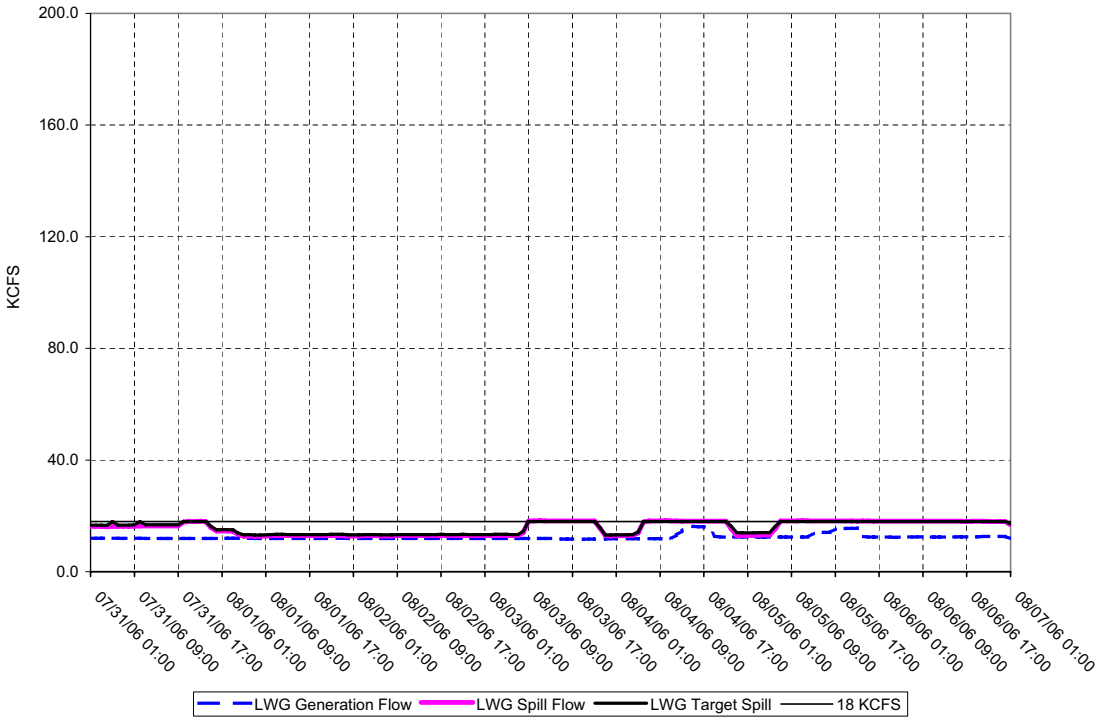
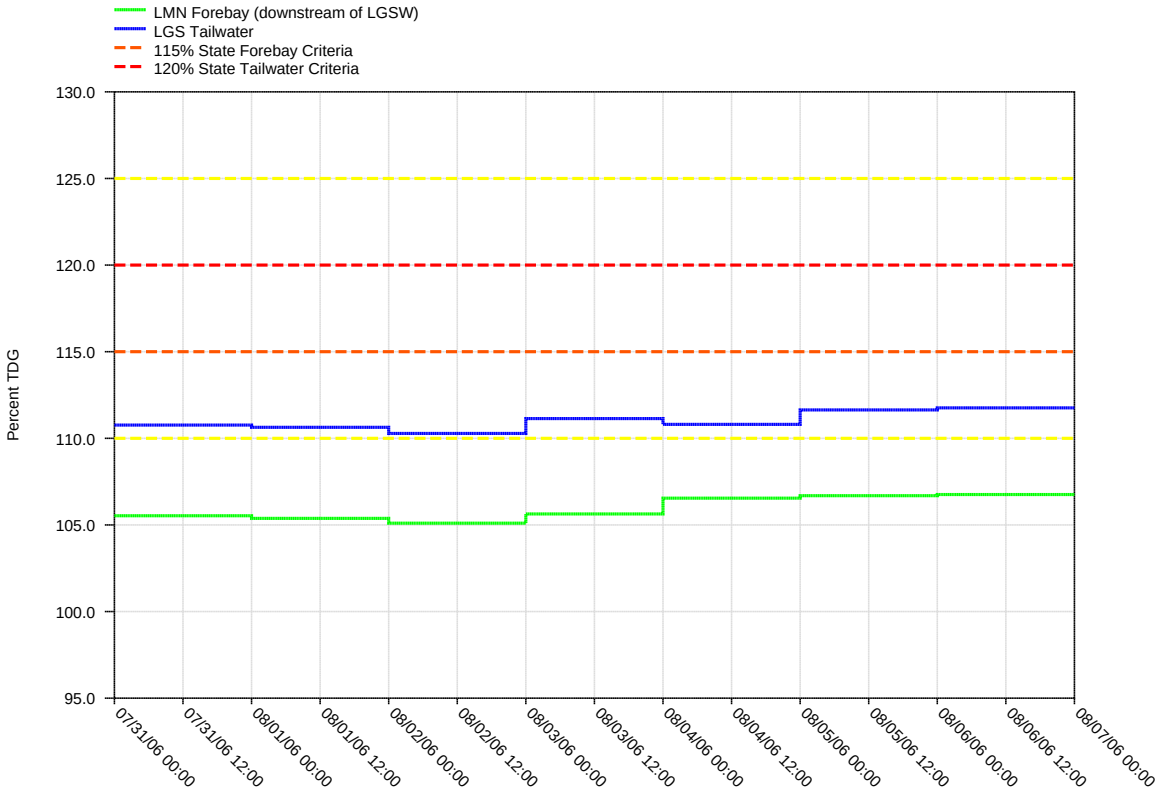


Figure 2.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

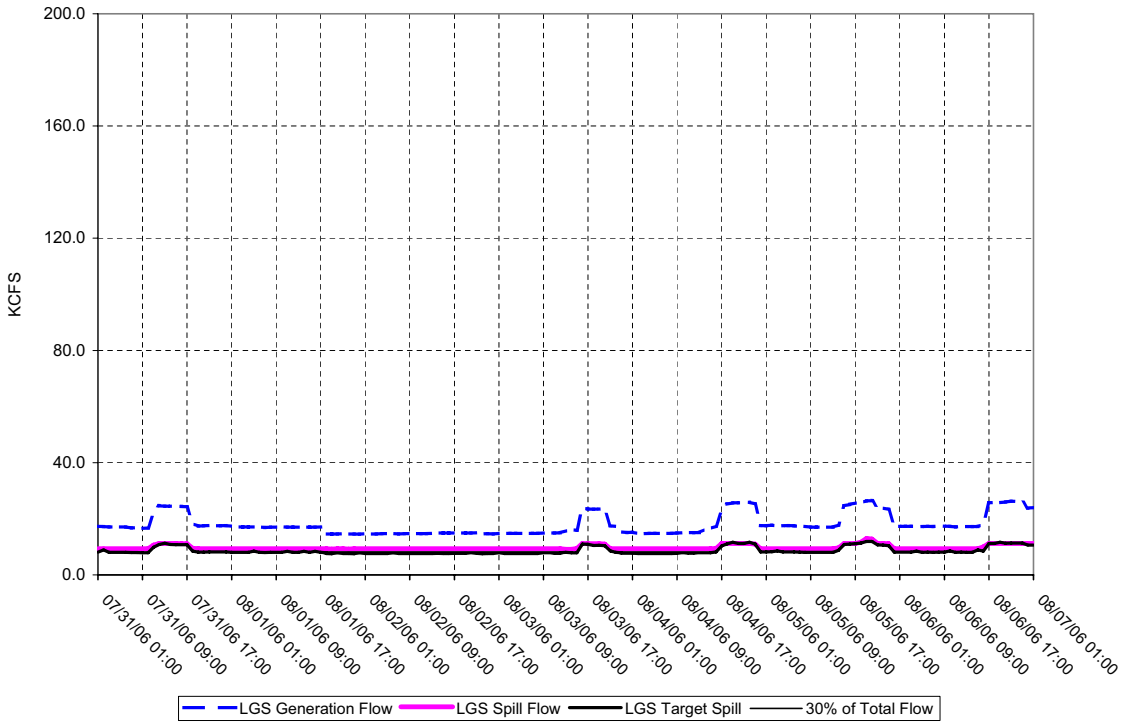
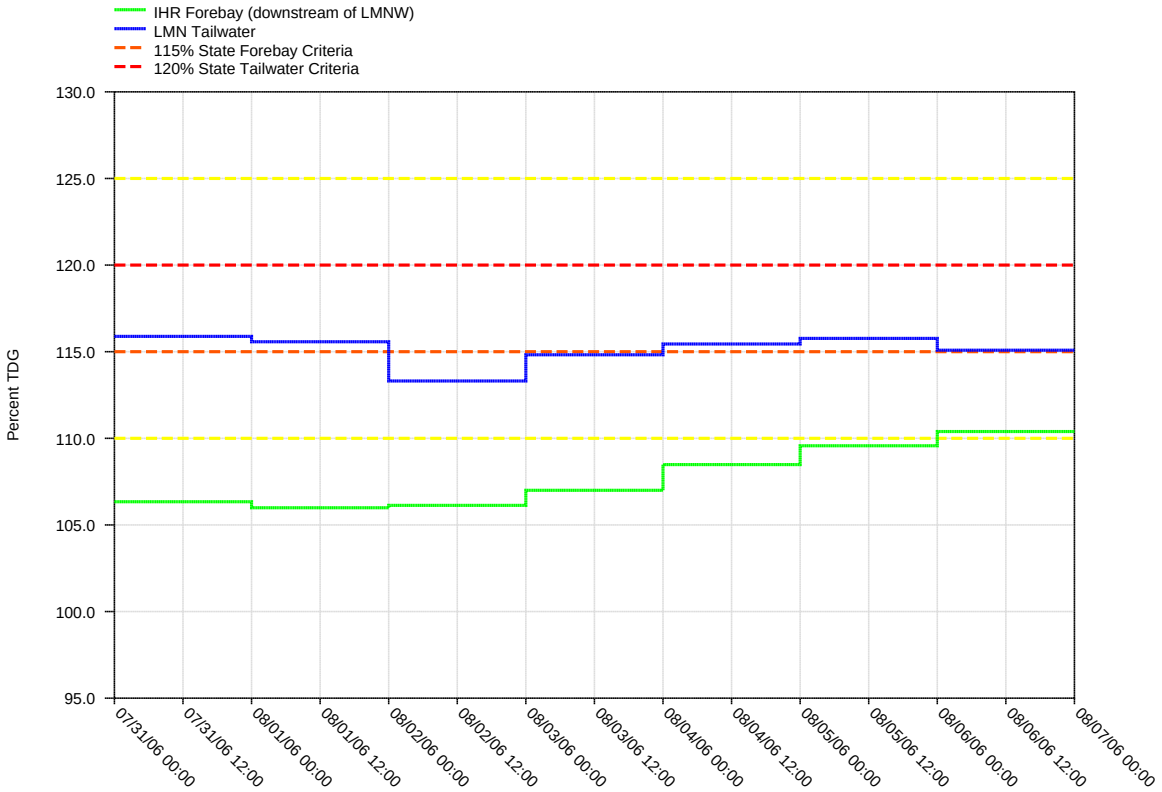


Figure 3.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

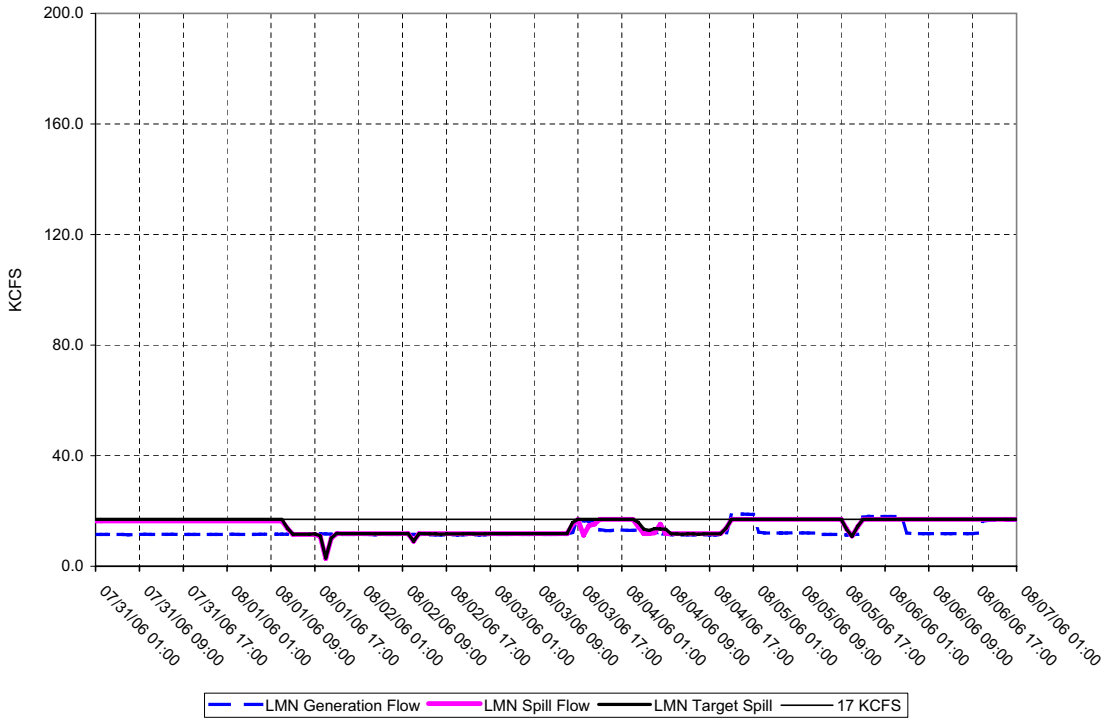
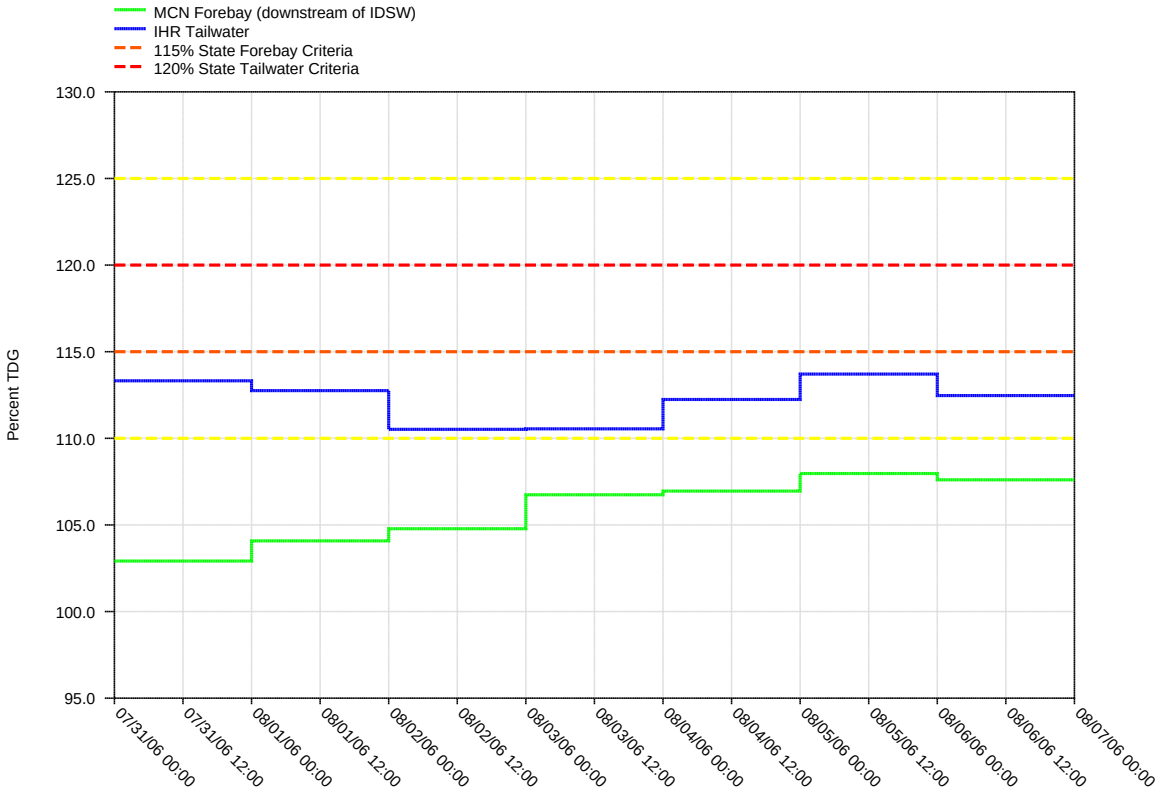


Figure 4.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

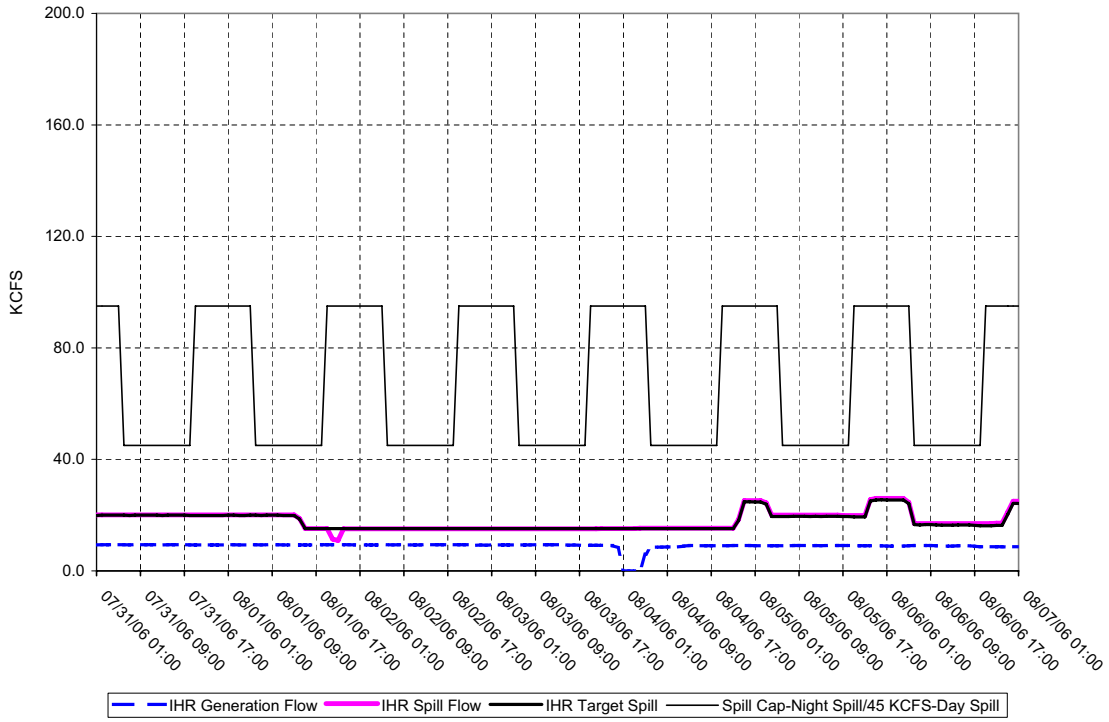
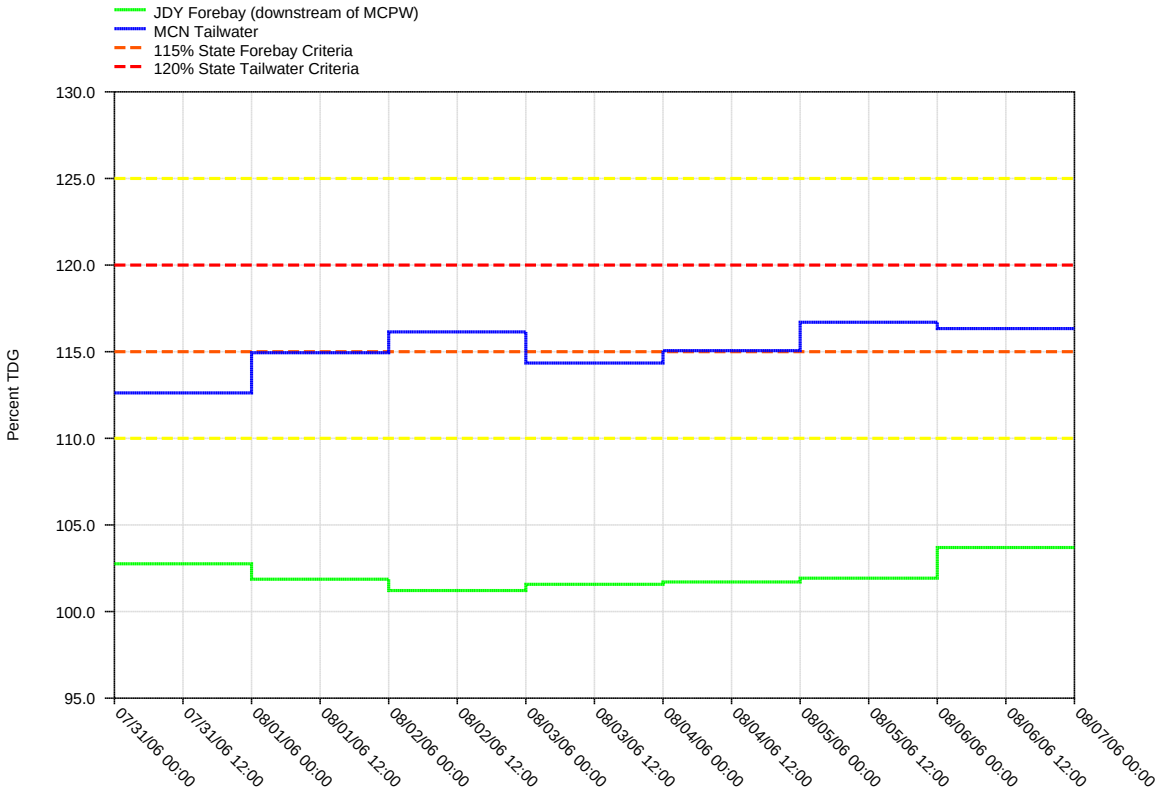


Figure 5.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

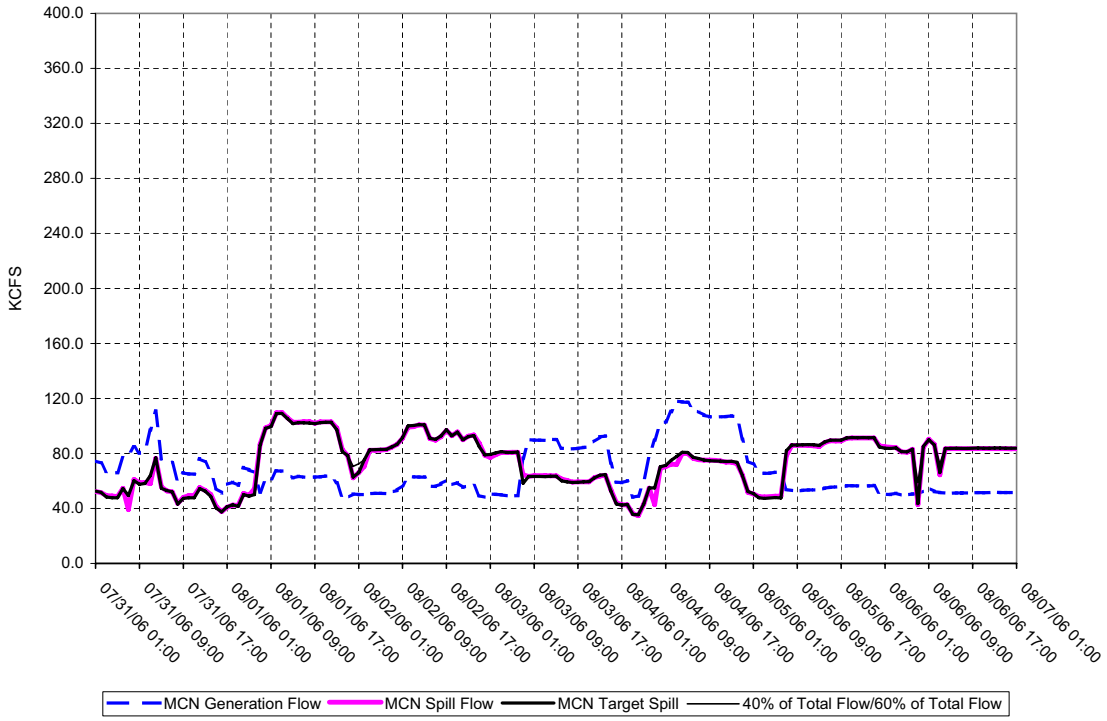
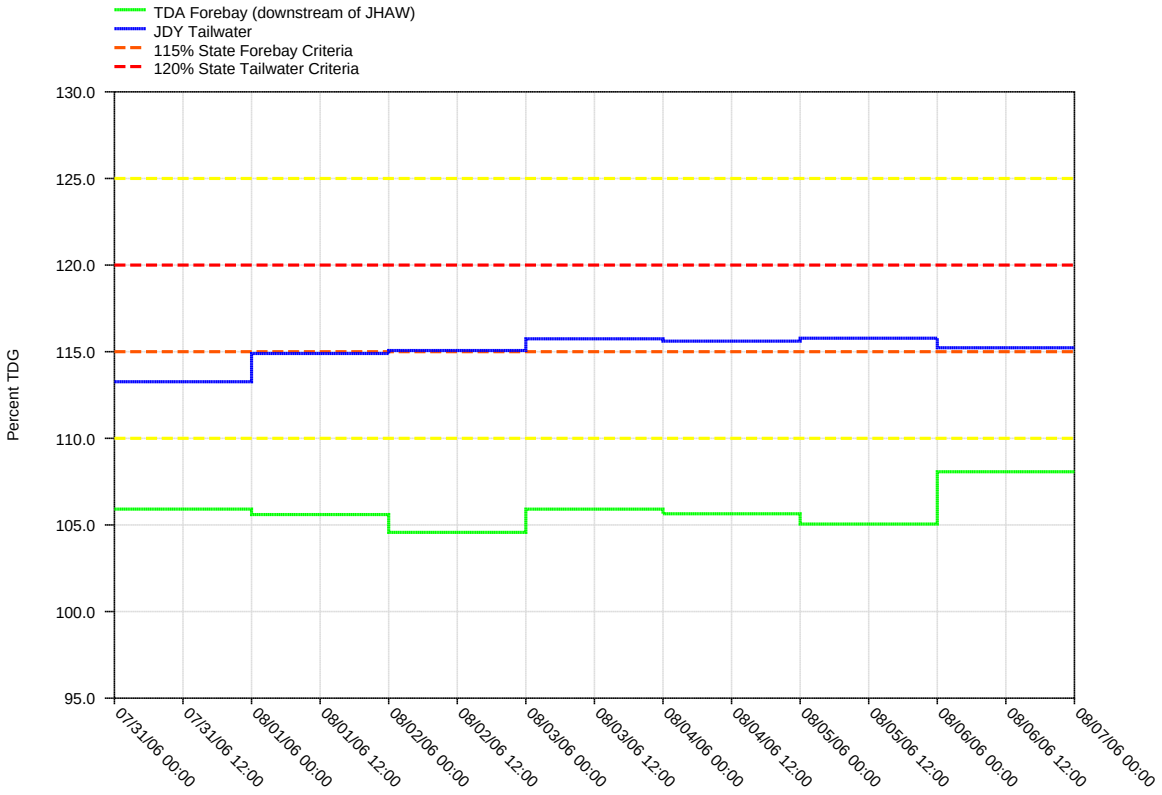


Figure 6.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

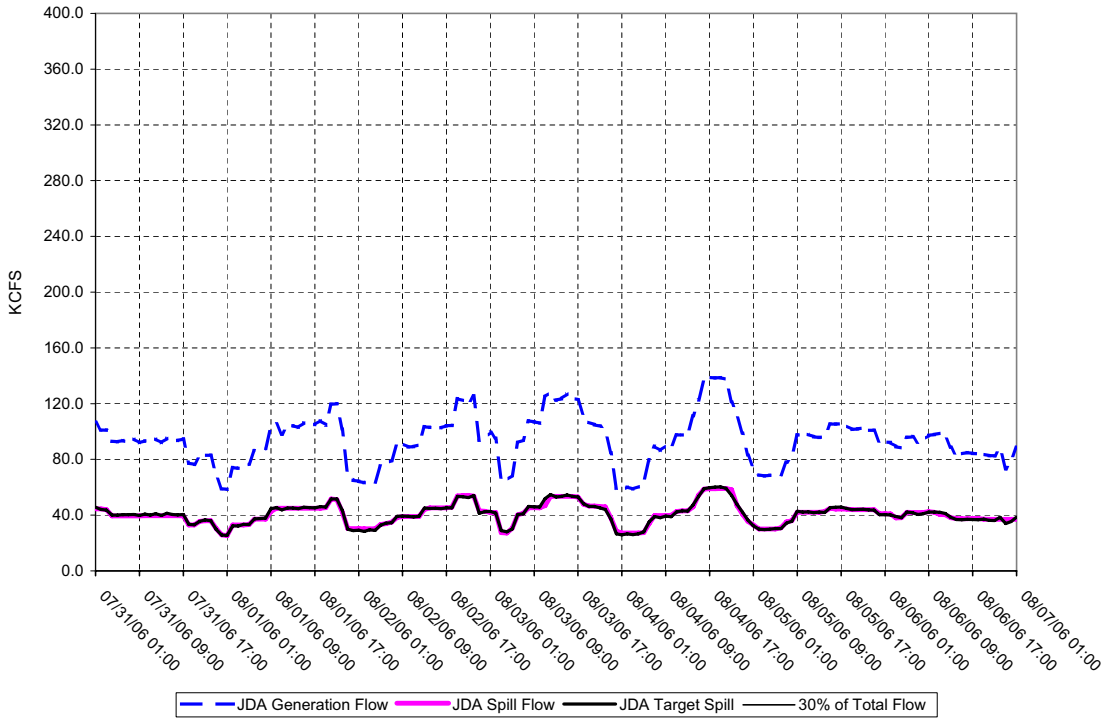
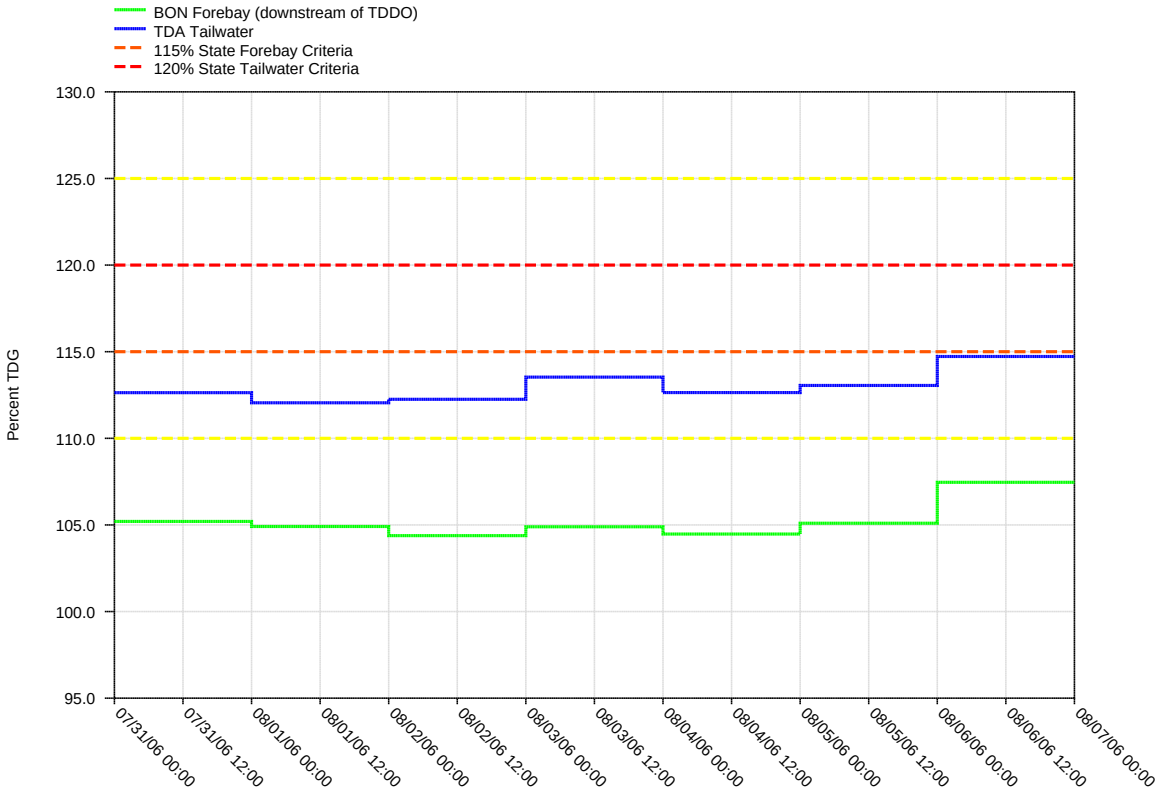


Figure 7.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

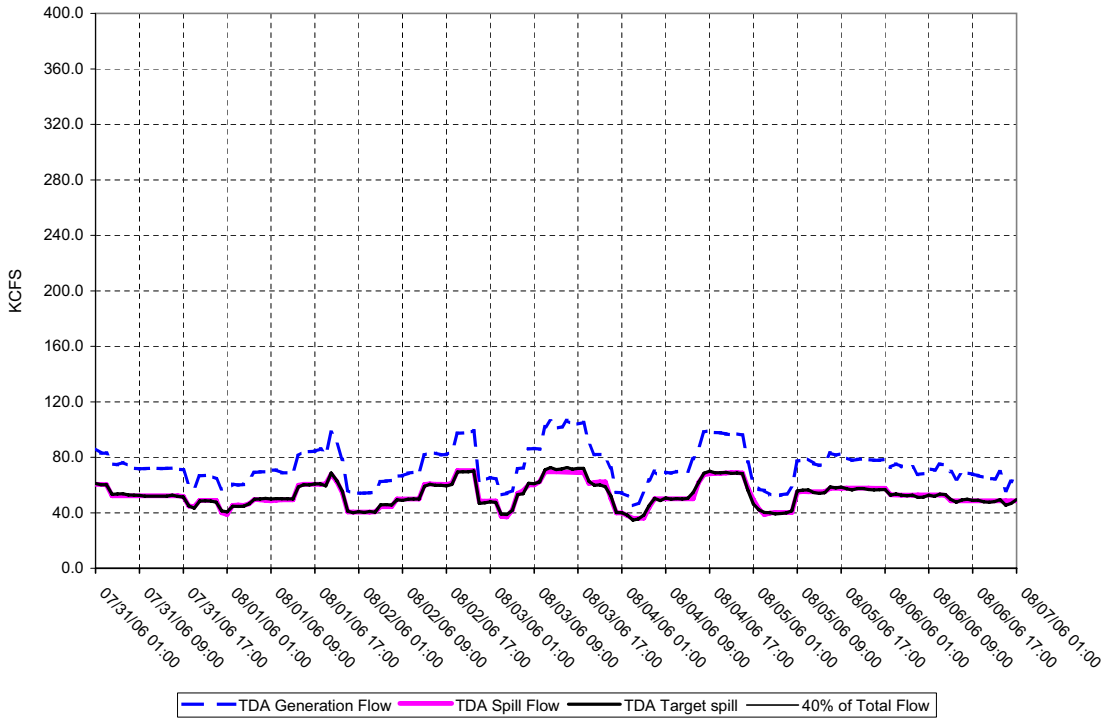
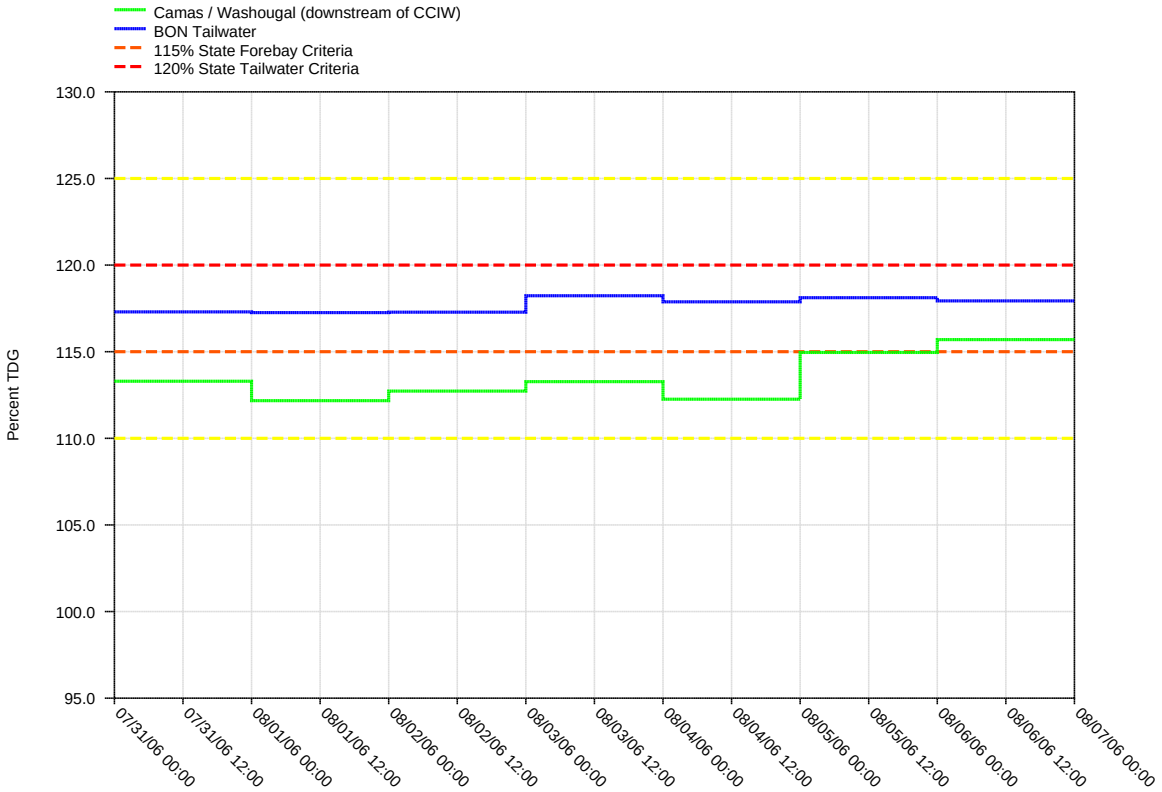


Figure 8.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

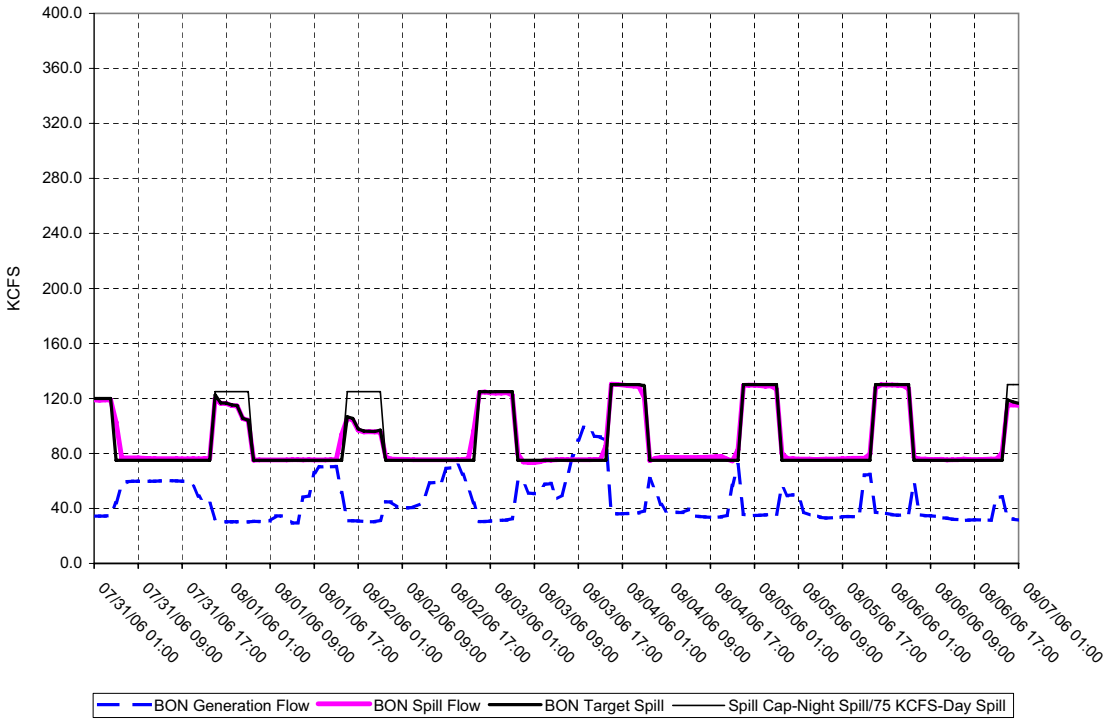
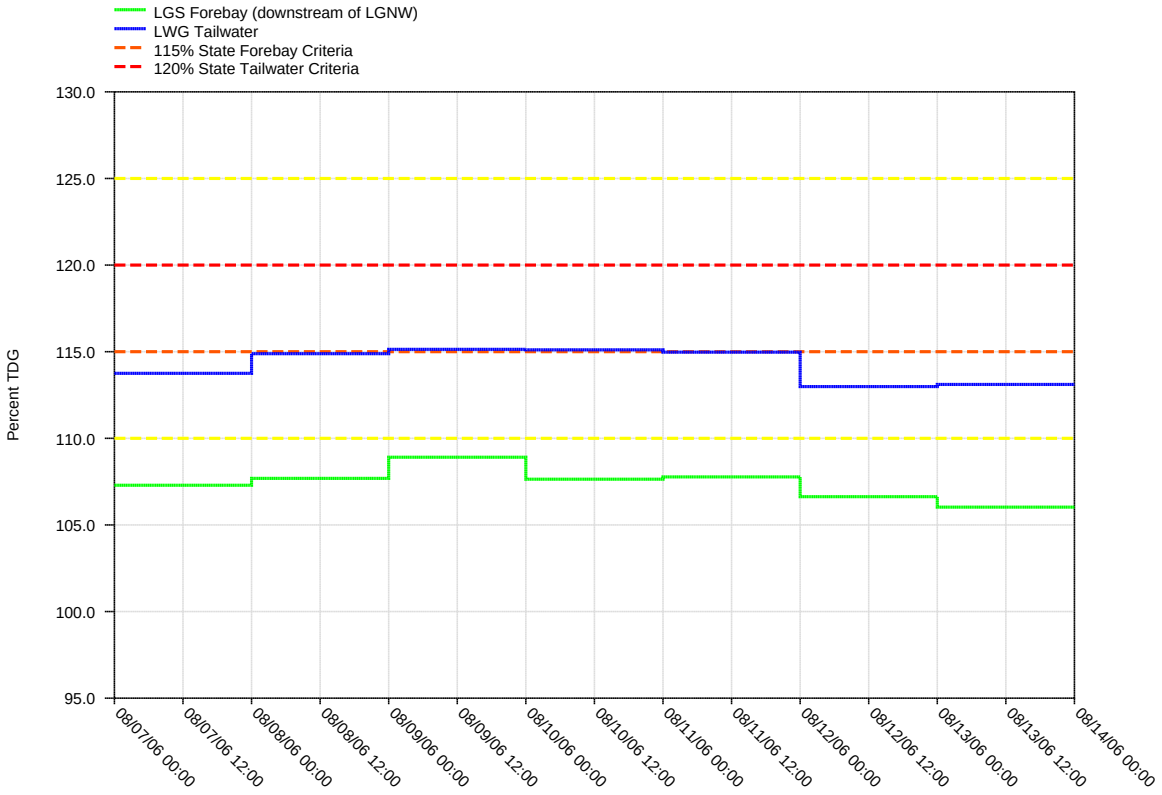


Figure 9.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

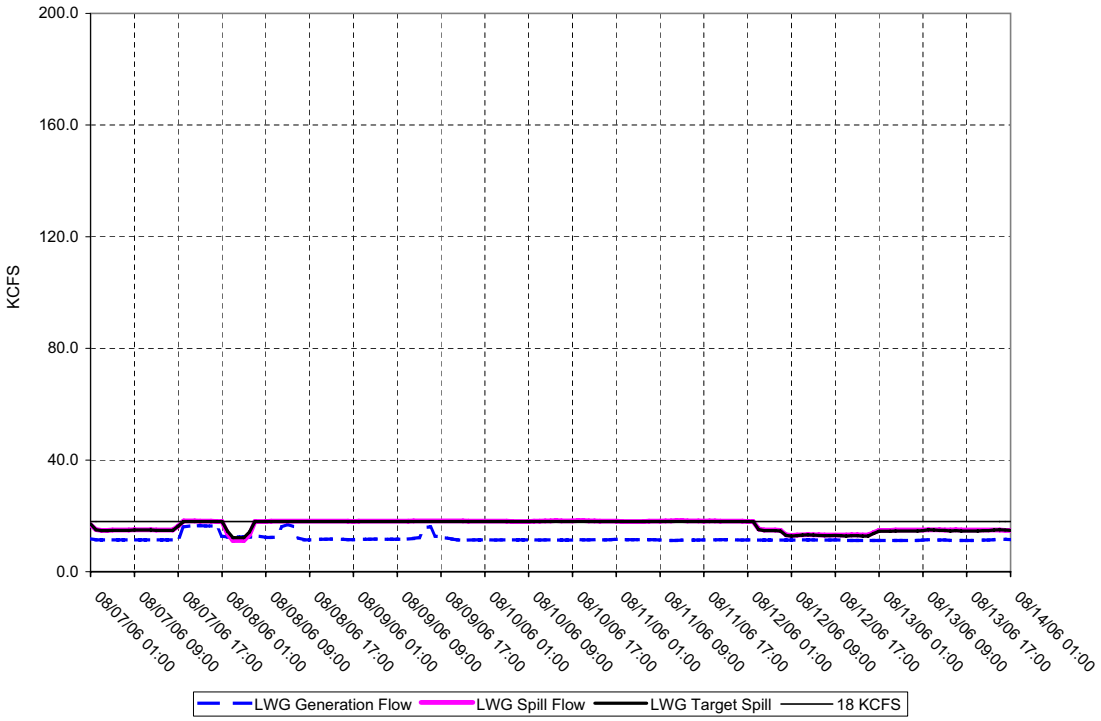
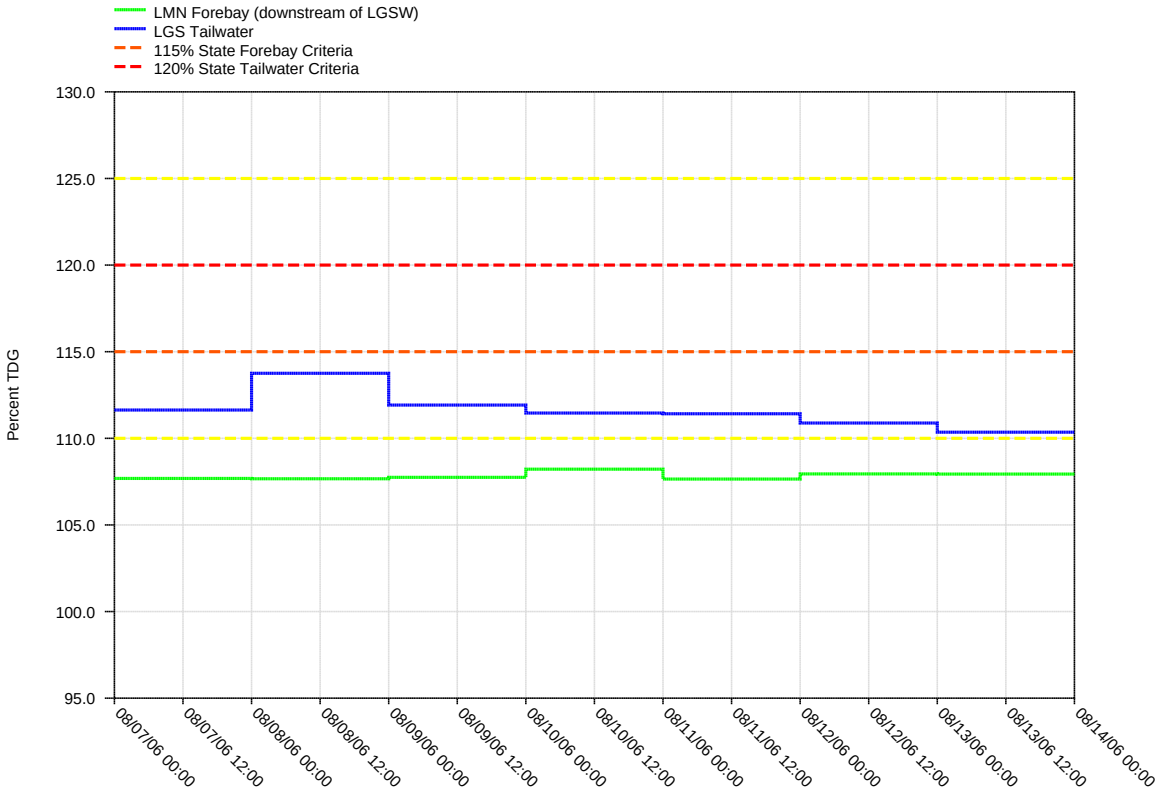
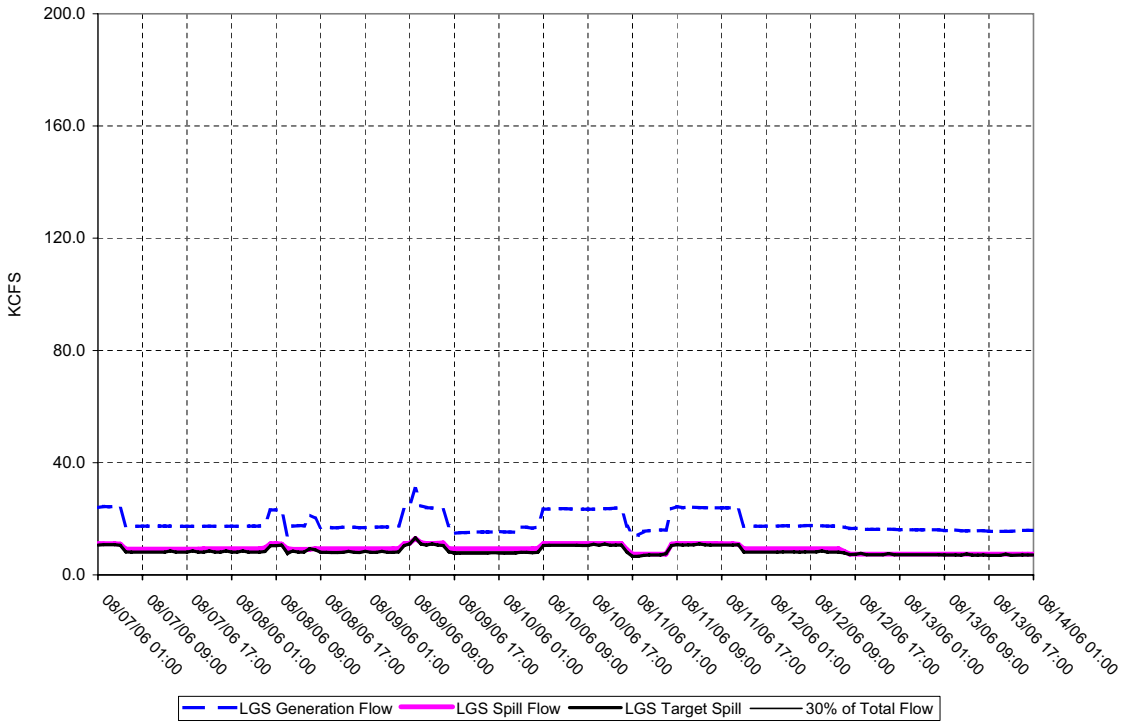


Figure 10.

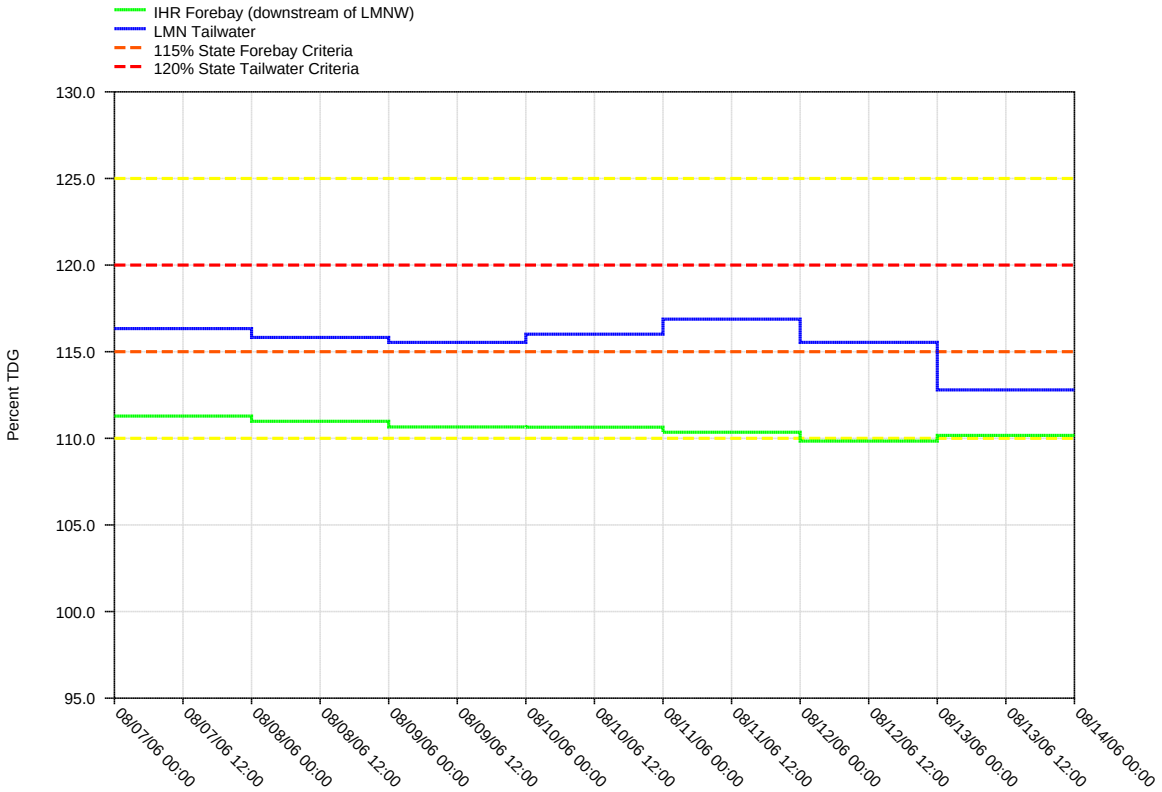
Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow



Daily Average of High 12 Hourly % TDG Values for Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

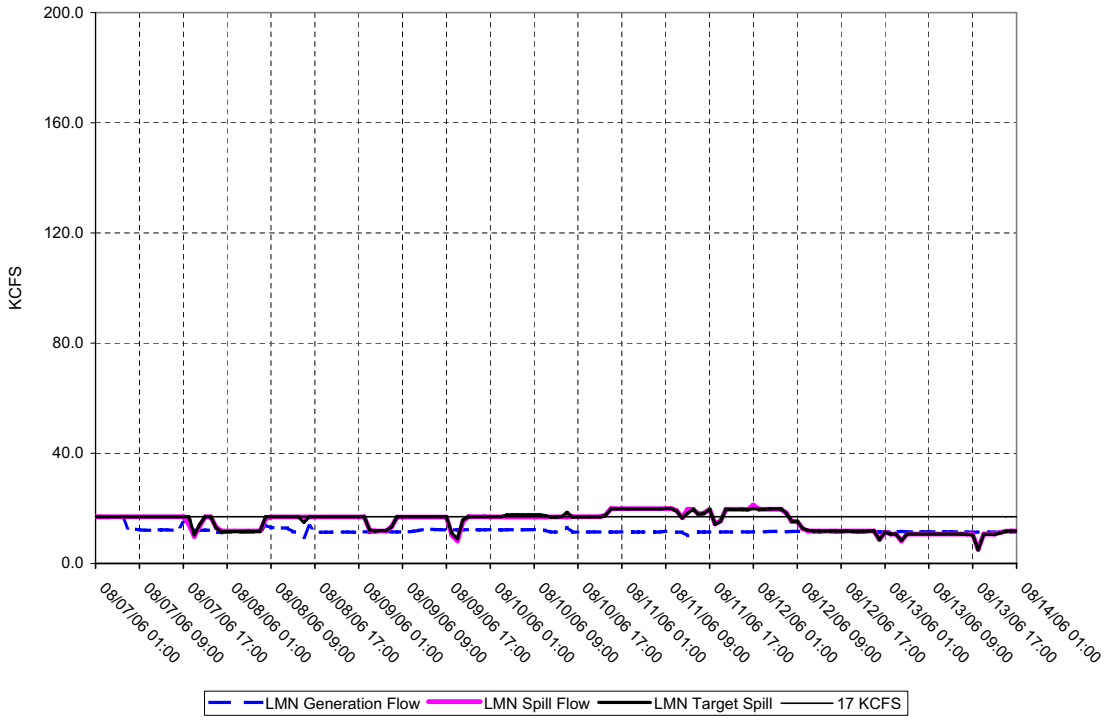
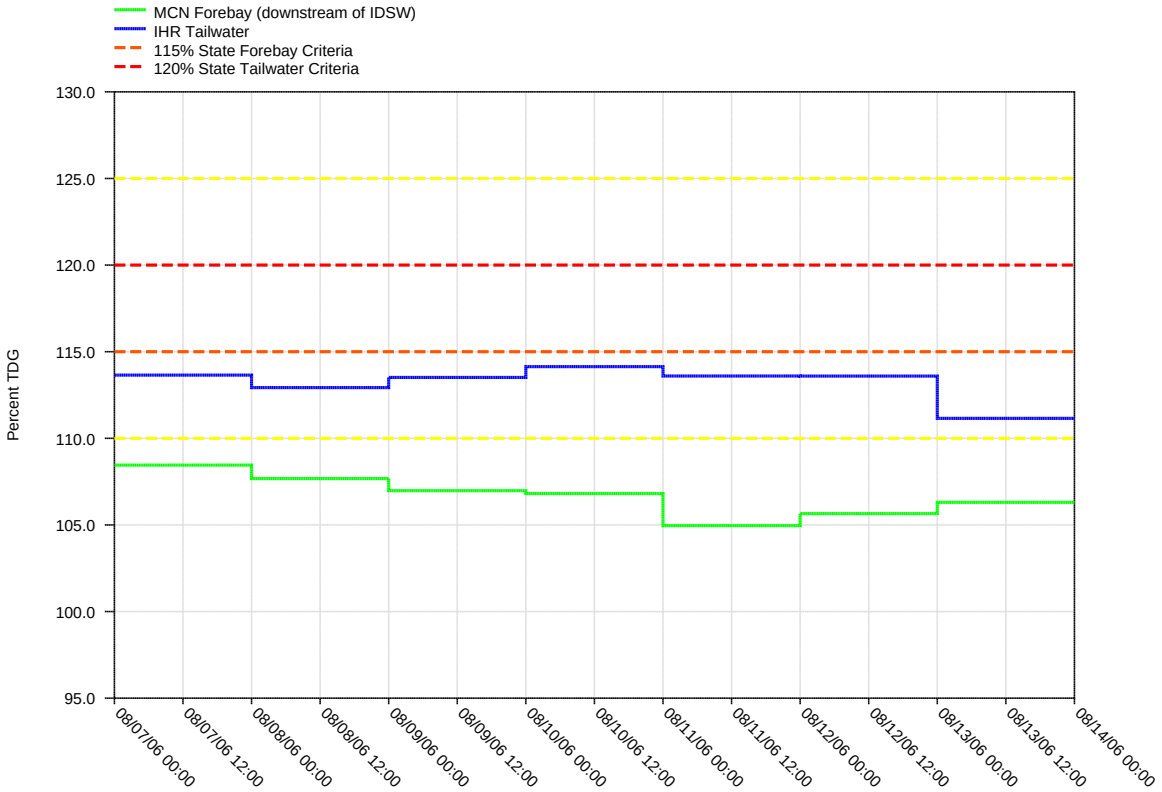


Figure 12.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

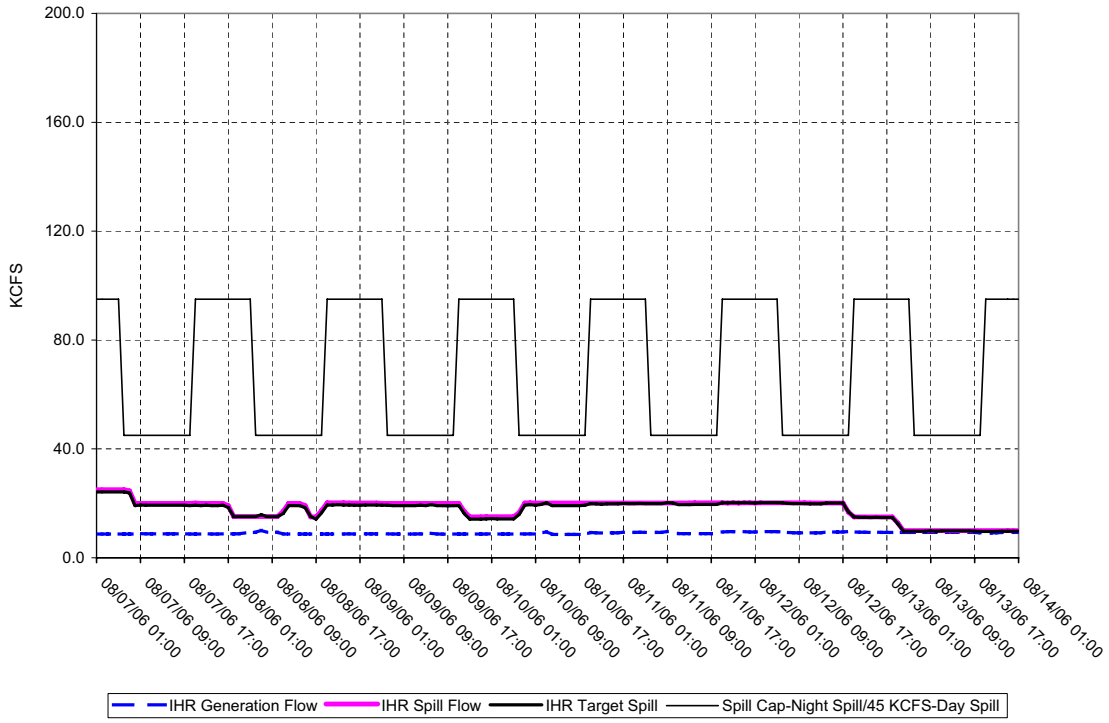
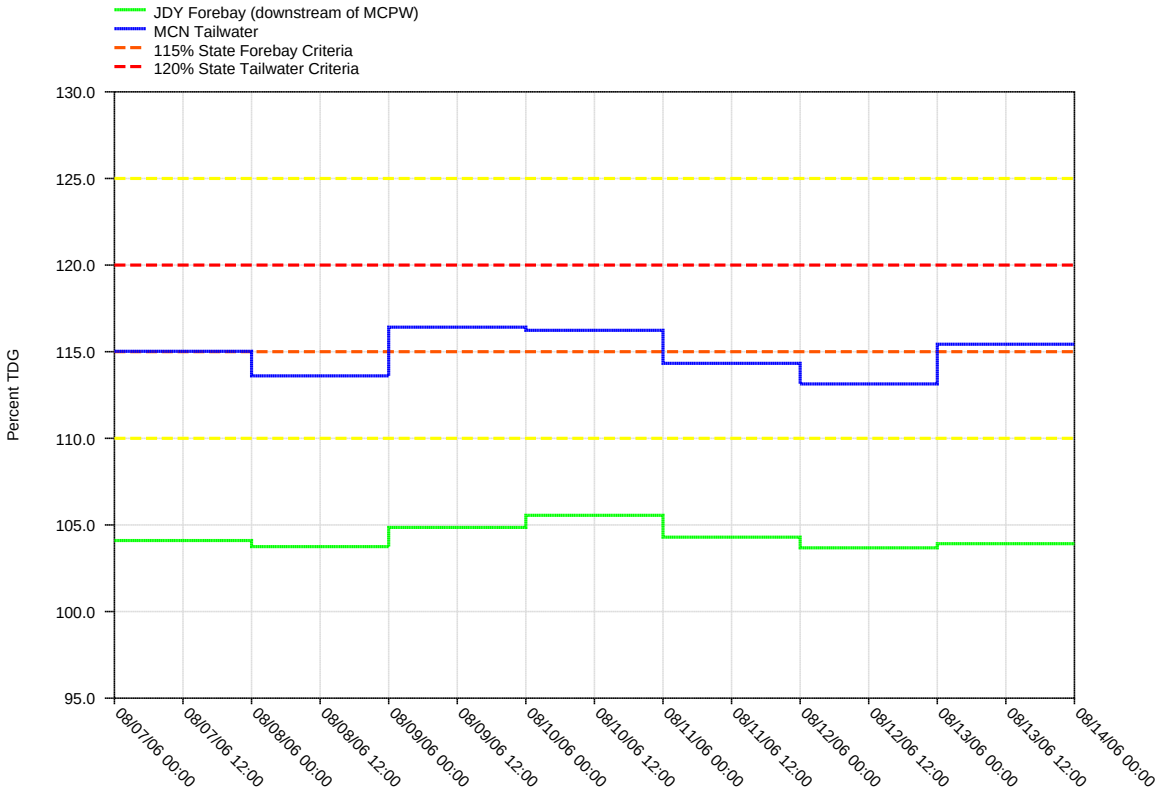


Figure 13.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

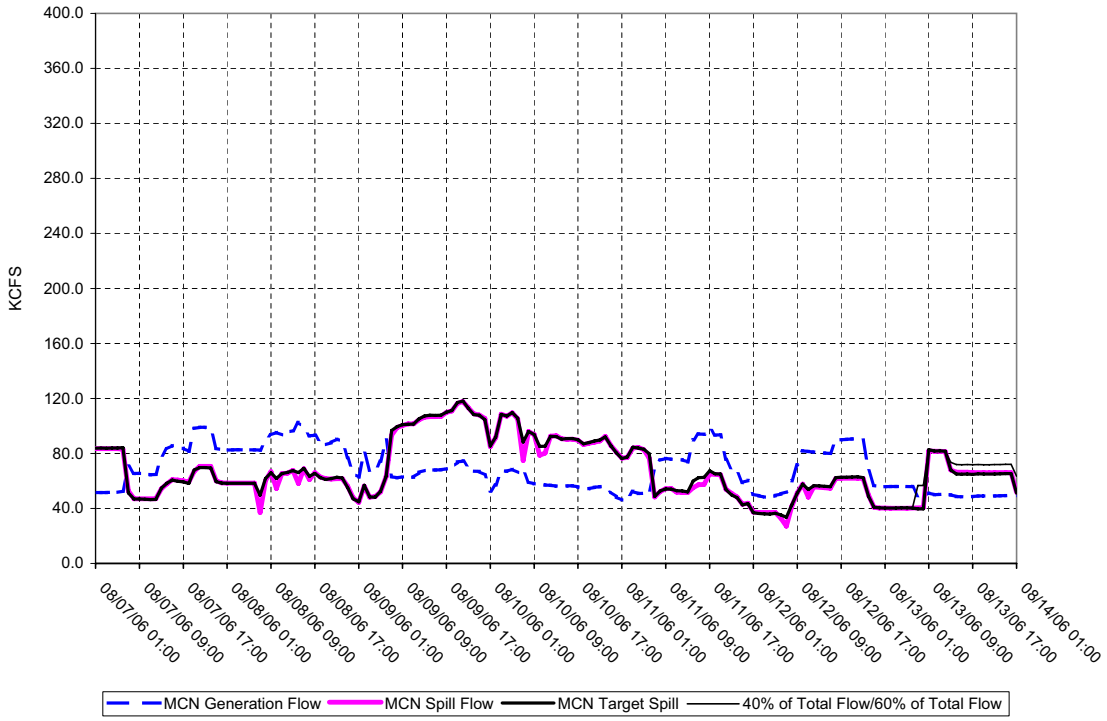
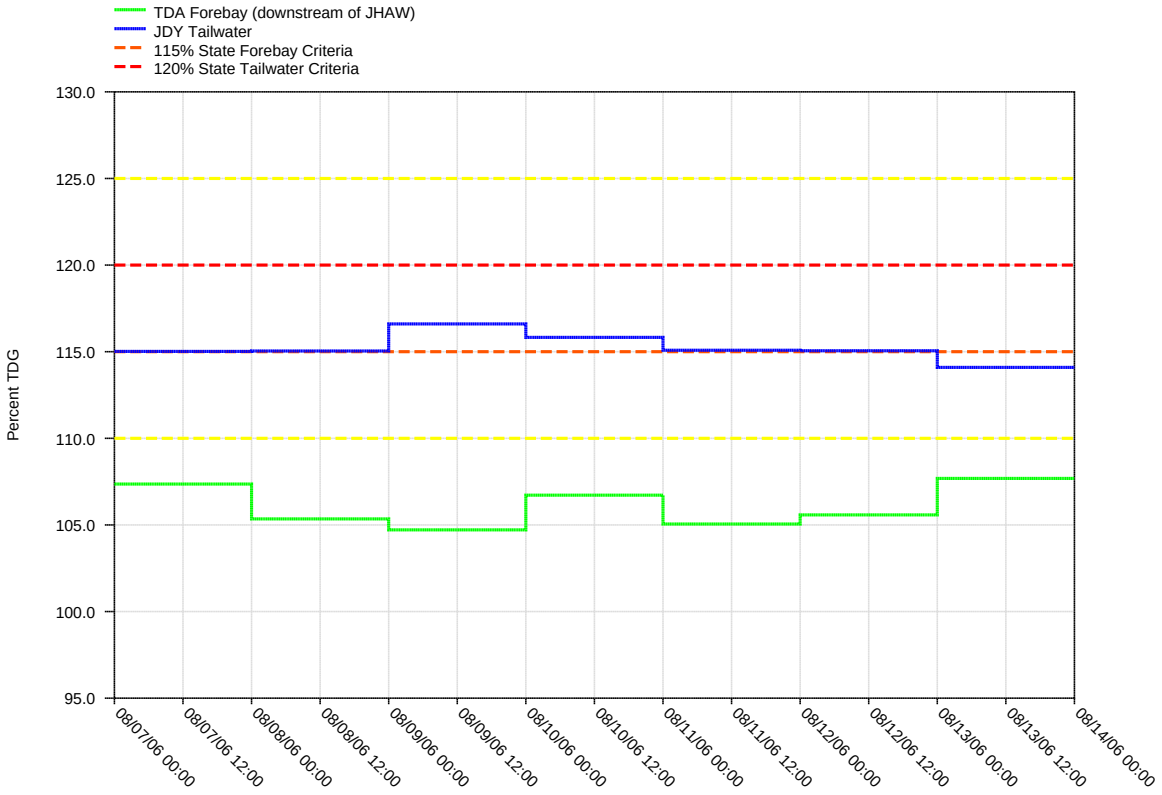


Figure 14.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

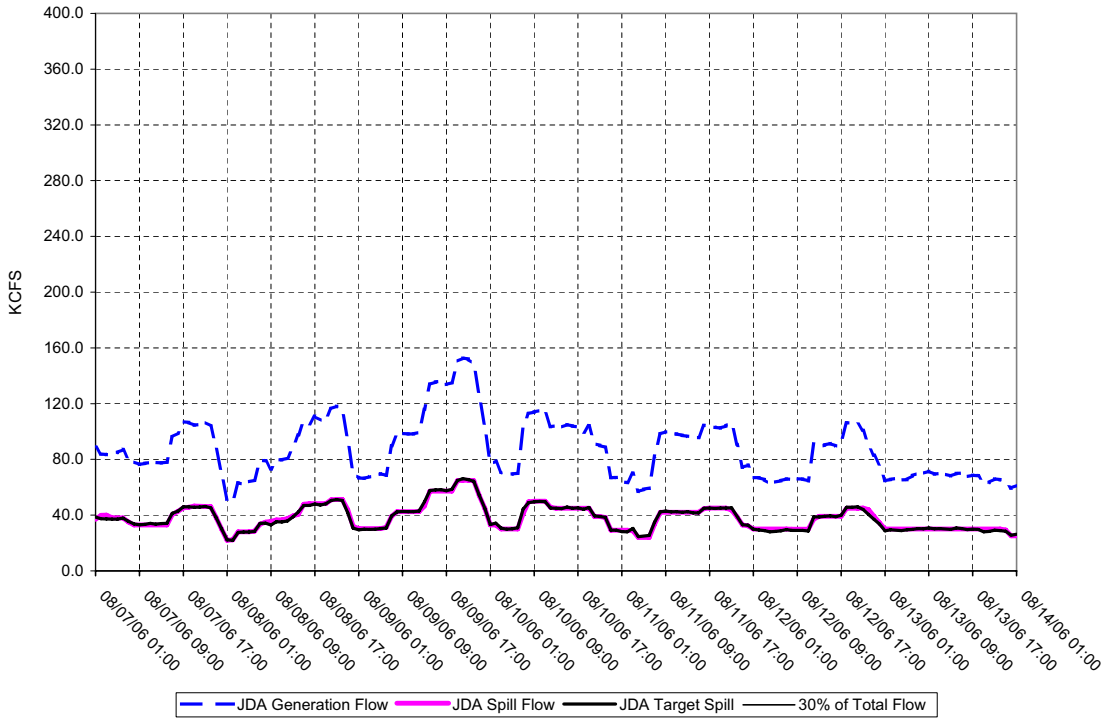
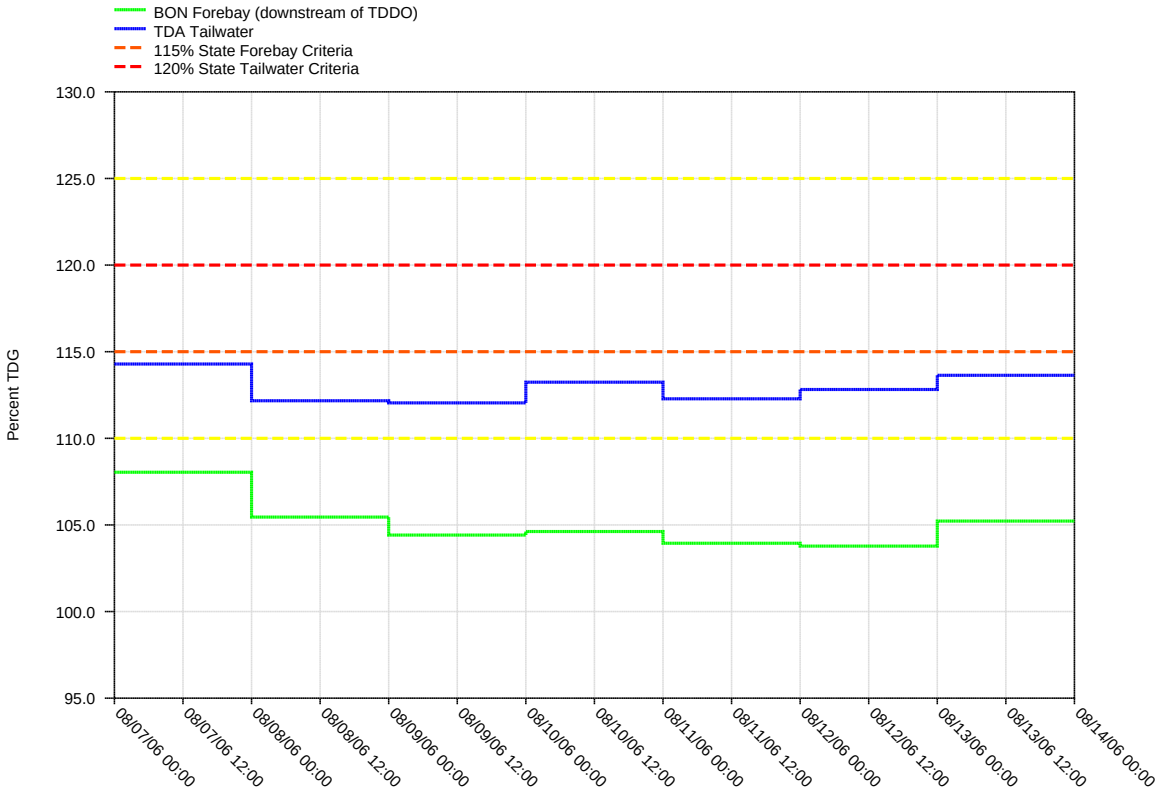


Figure 15.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

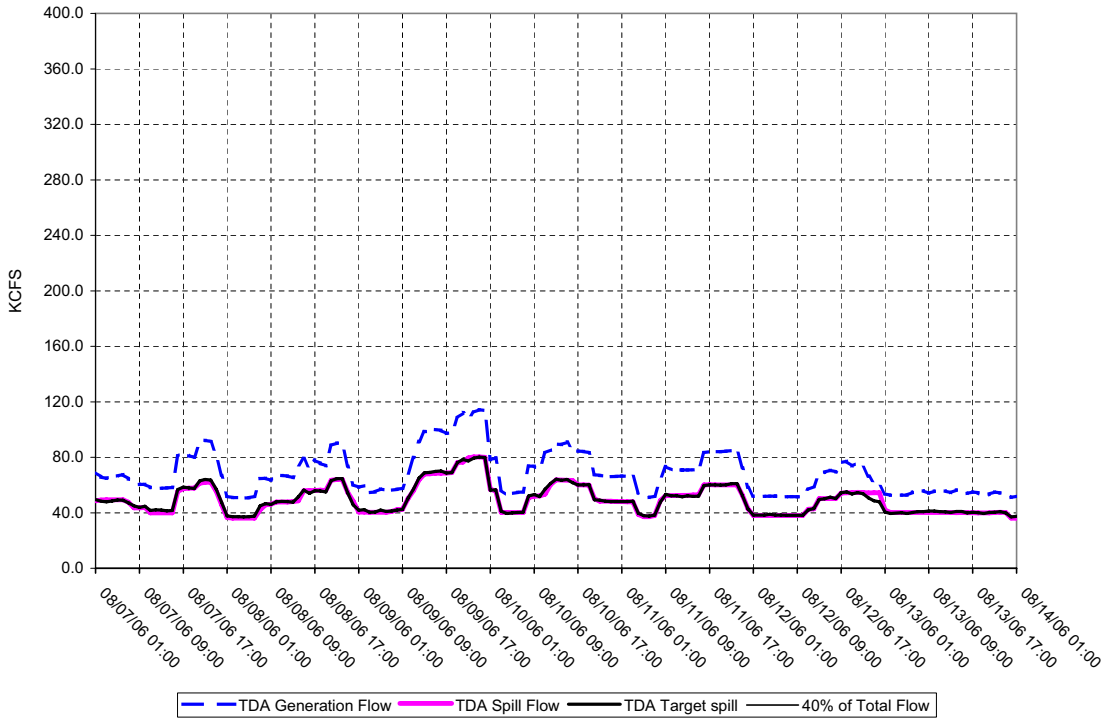
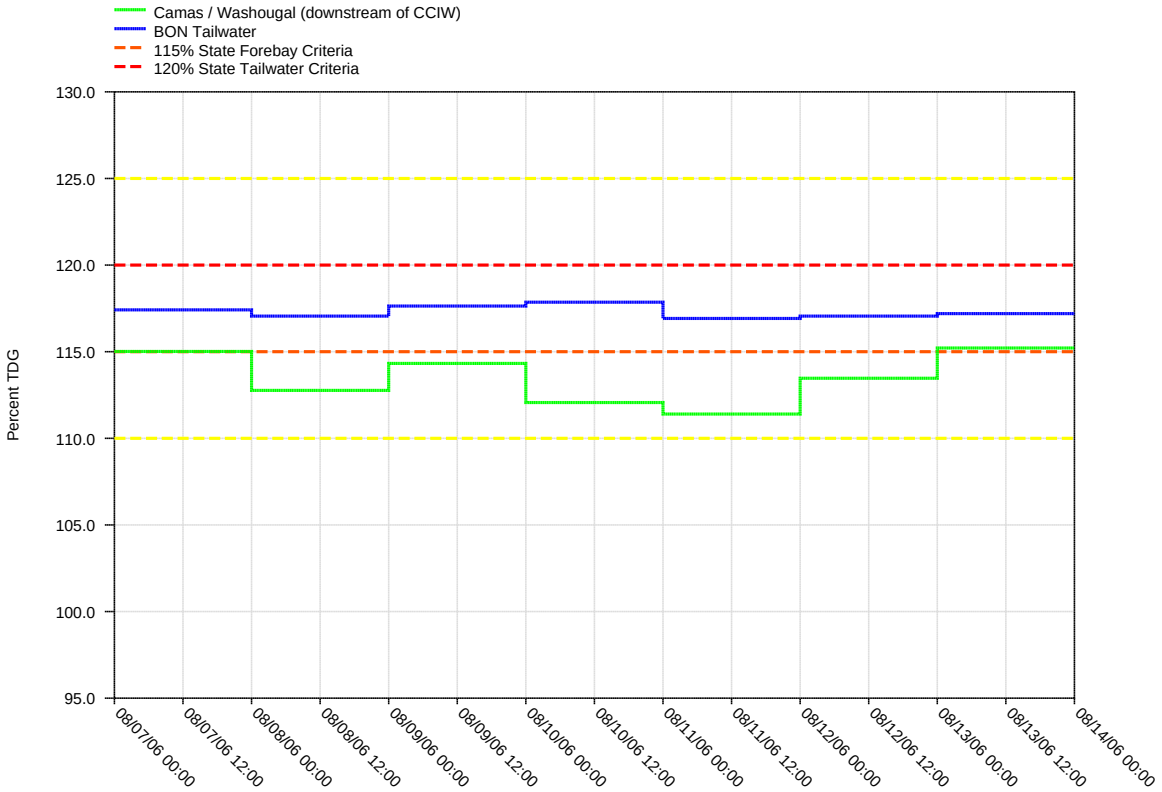


Figure 16.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

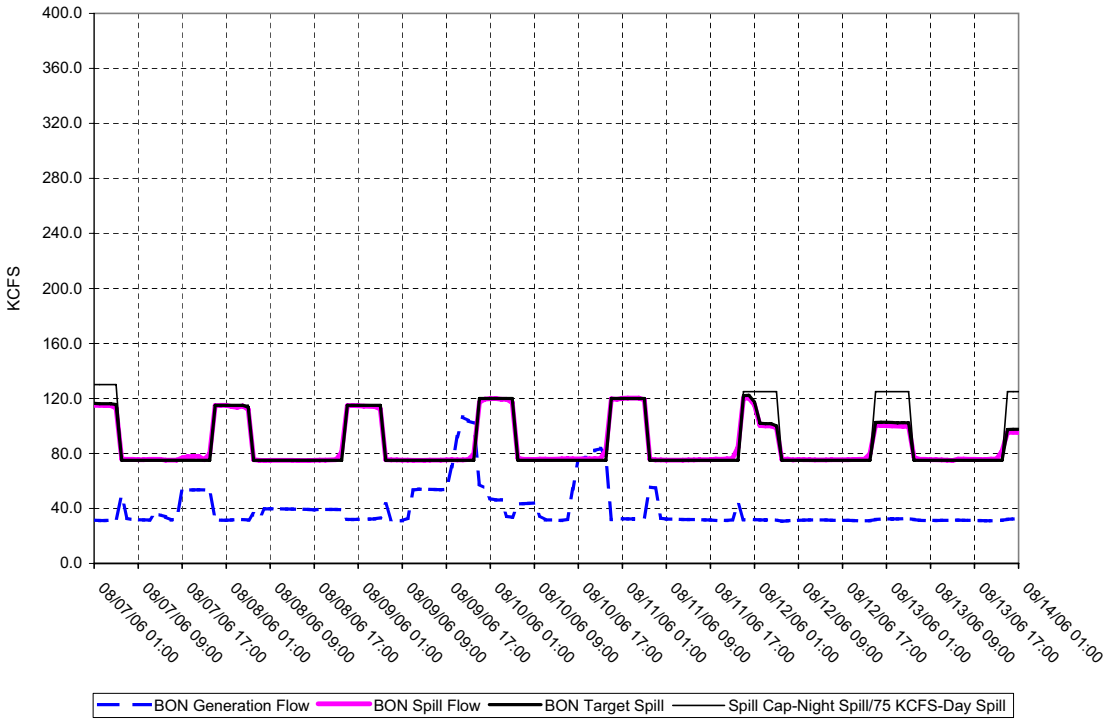
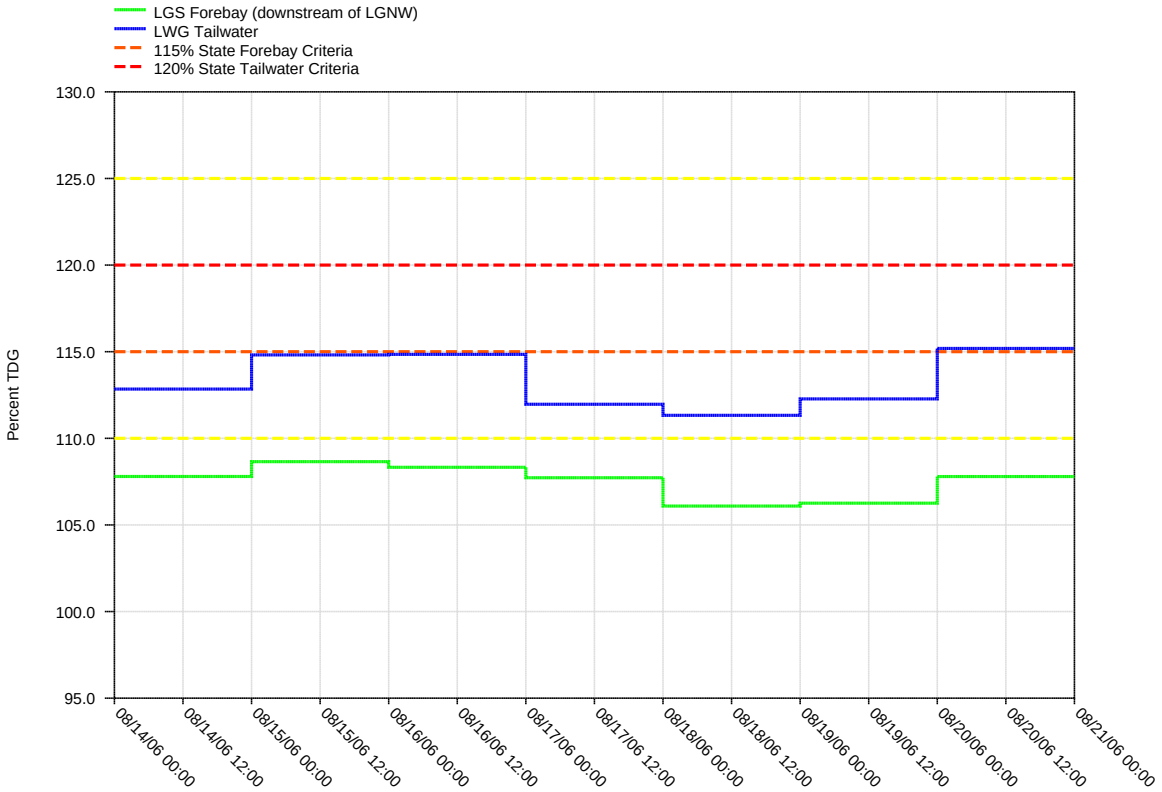


Figure 17.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

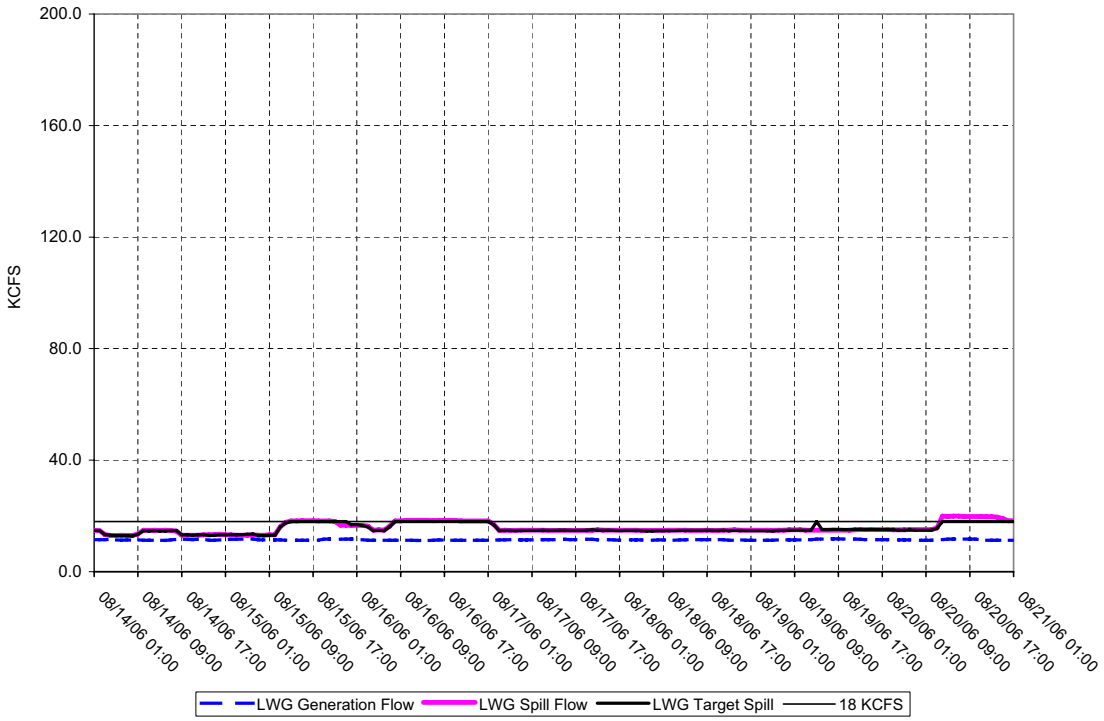
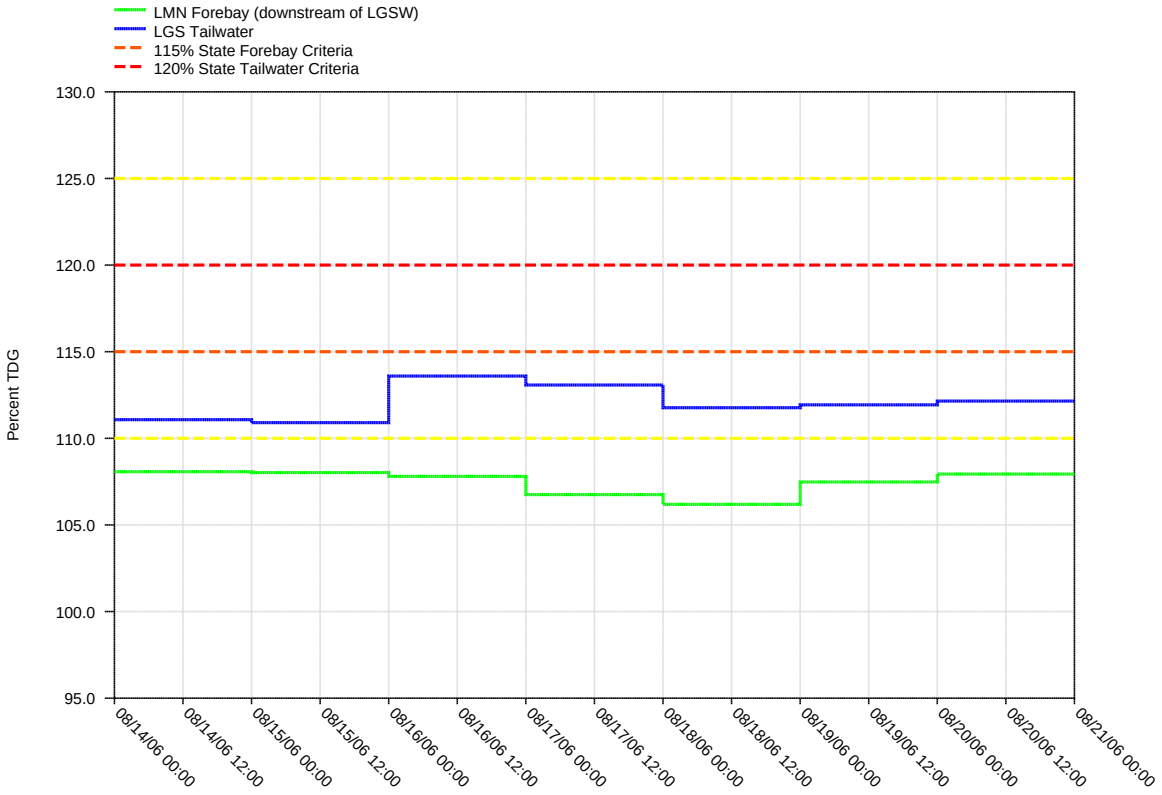


Figure 18.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

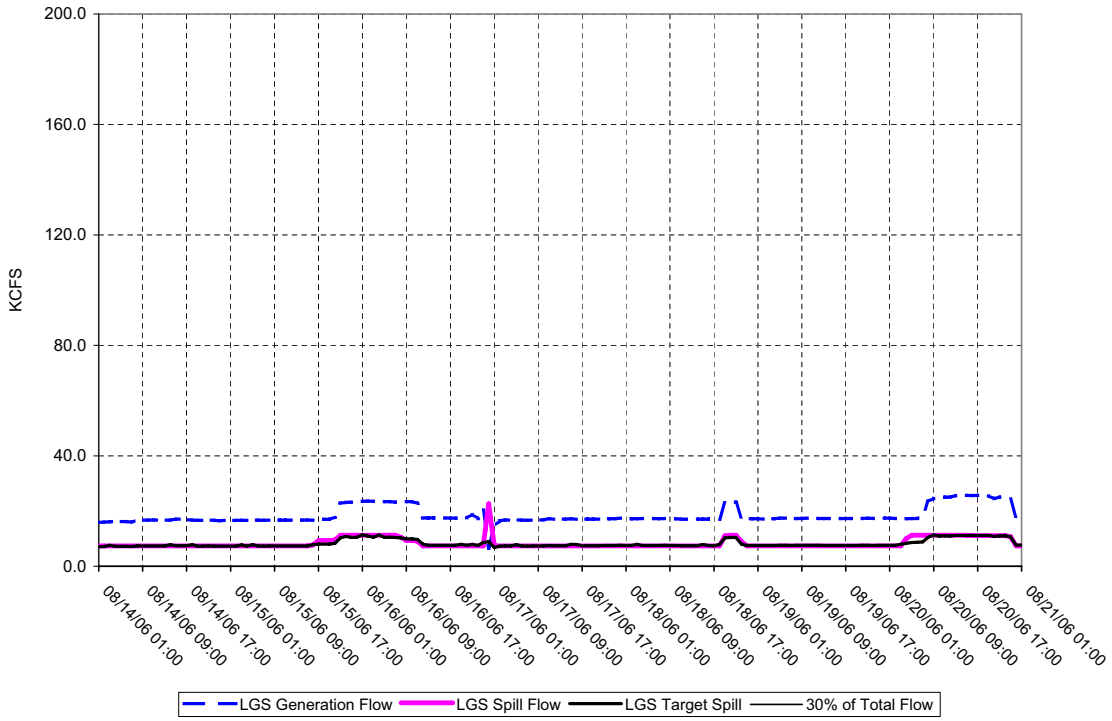
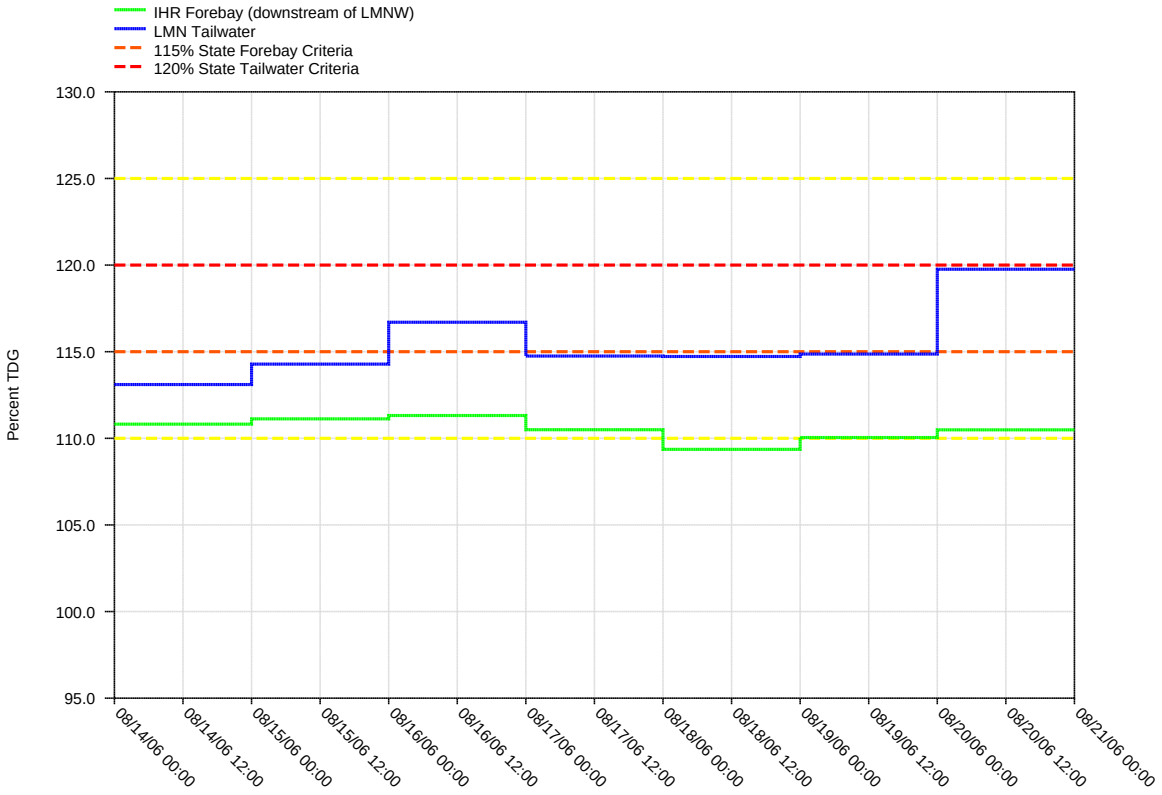


Figure 19.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

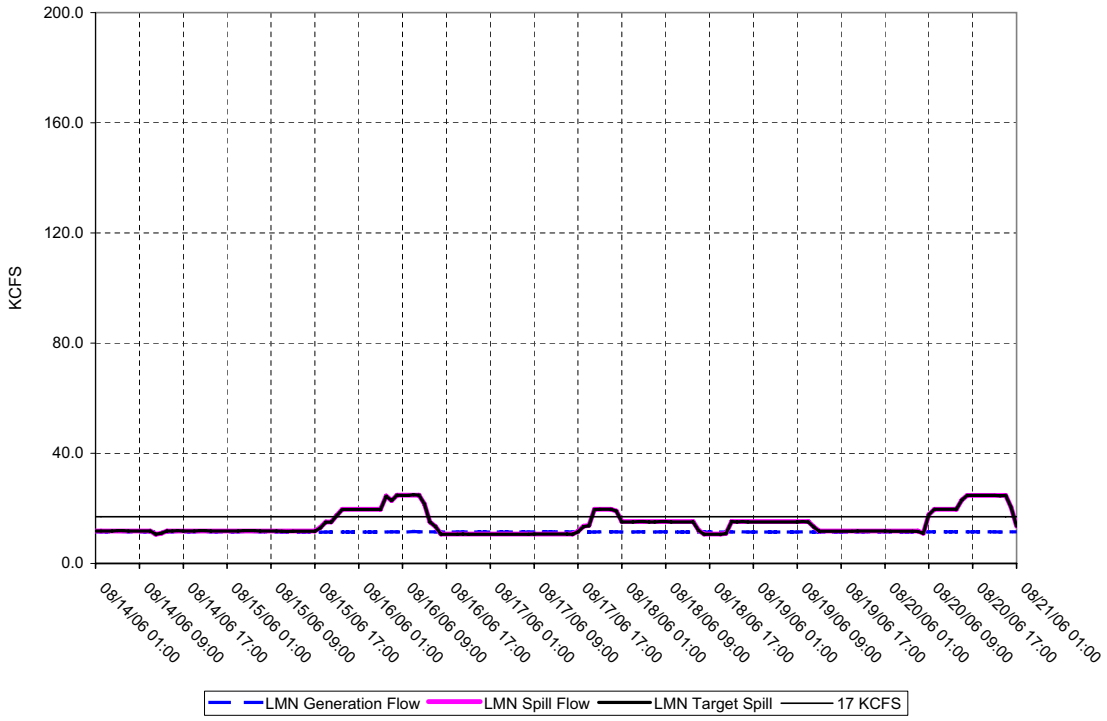
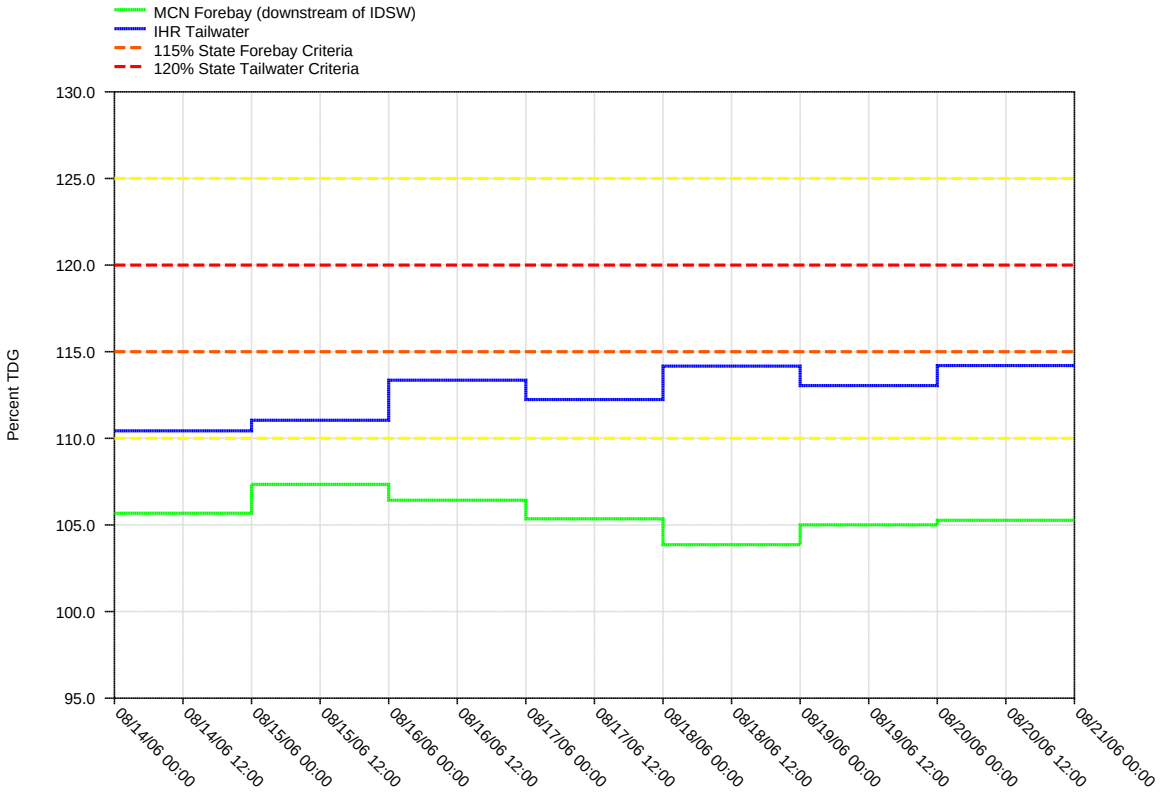


Figure 20.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

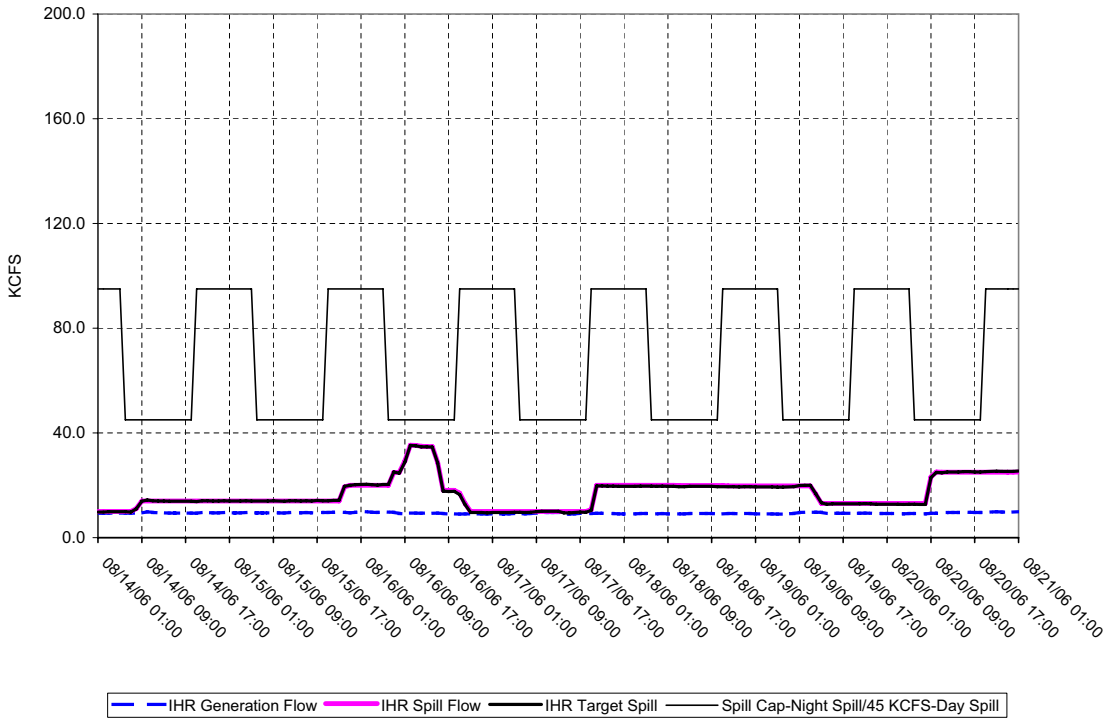
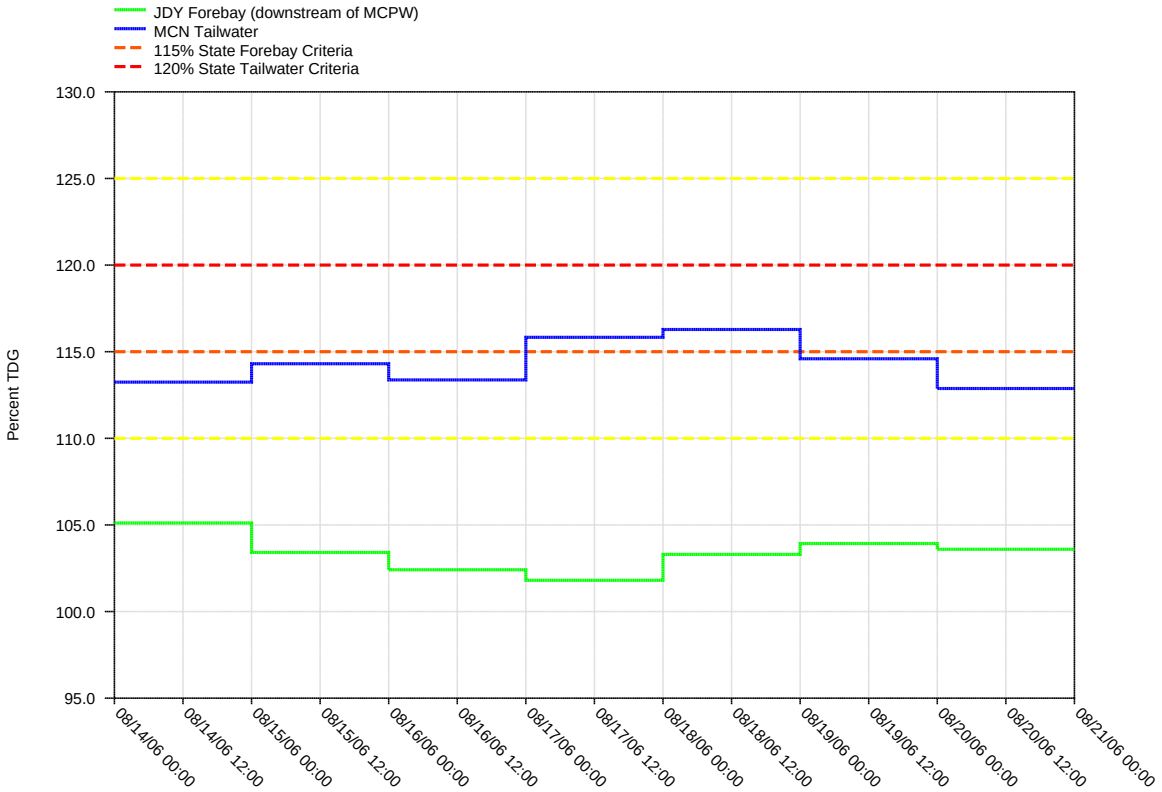


Figure 21.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

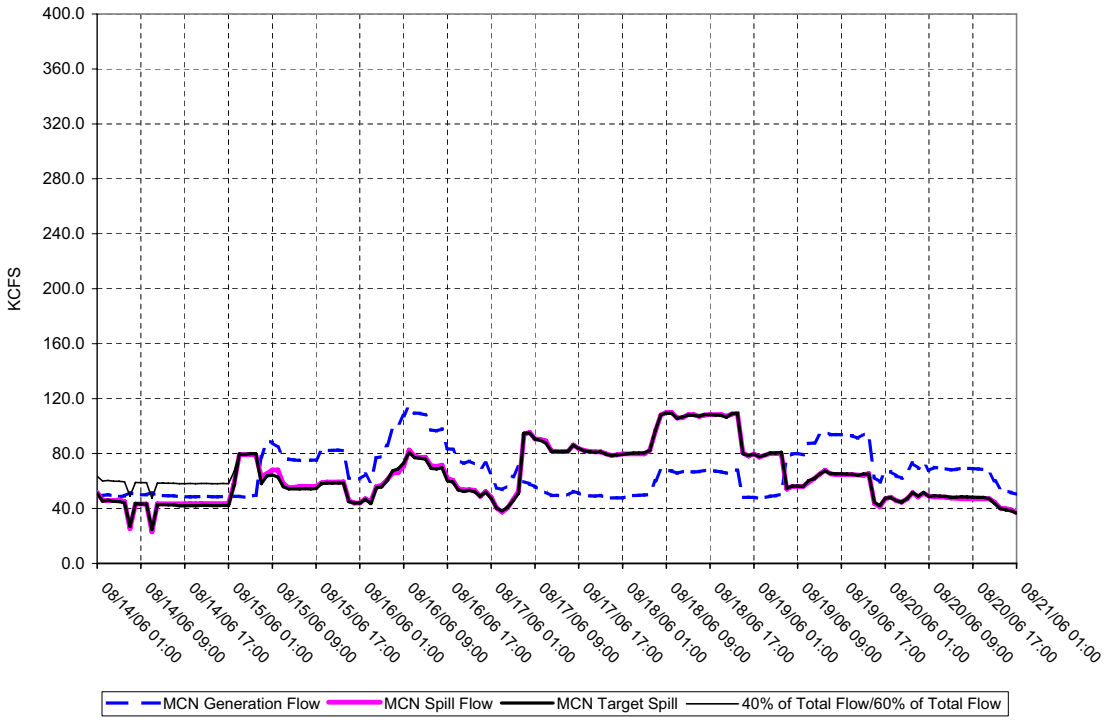
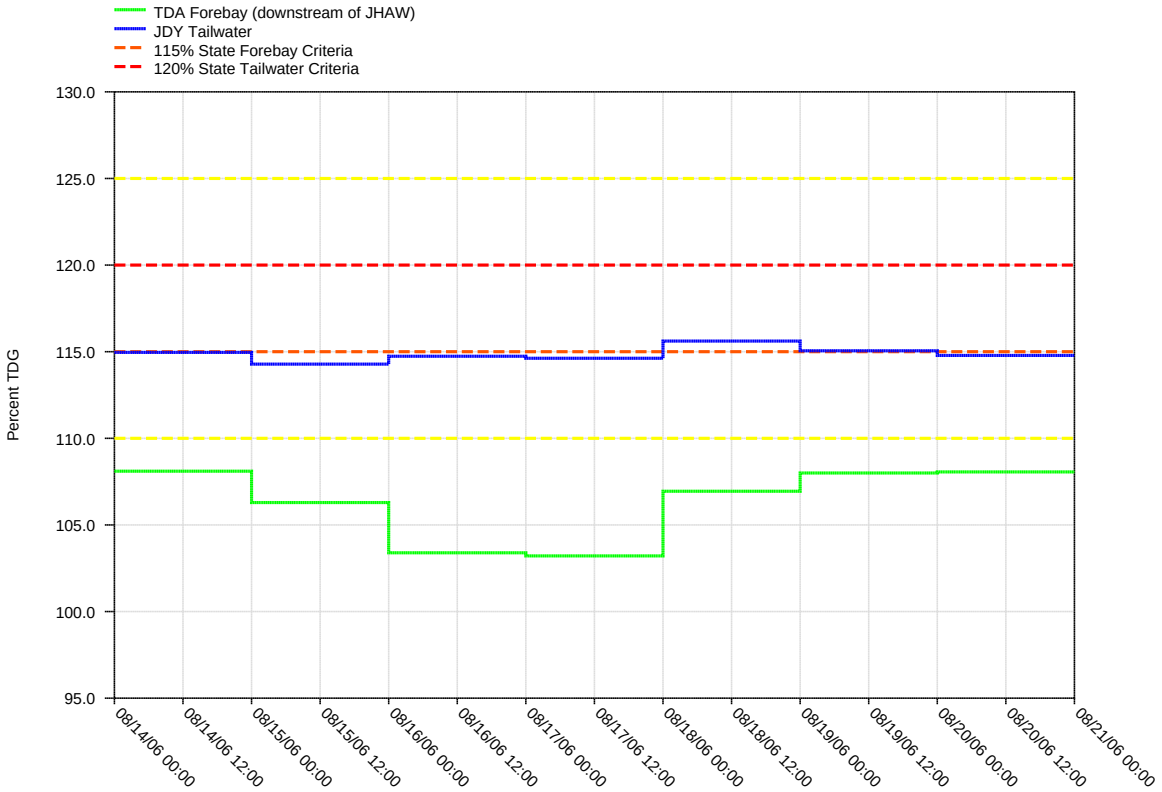


Figure 22.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

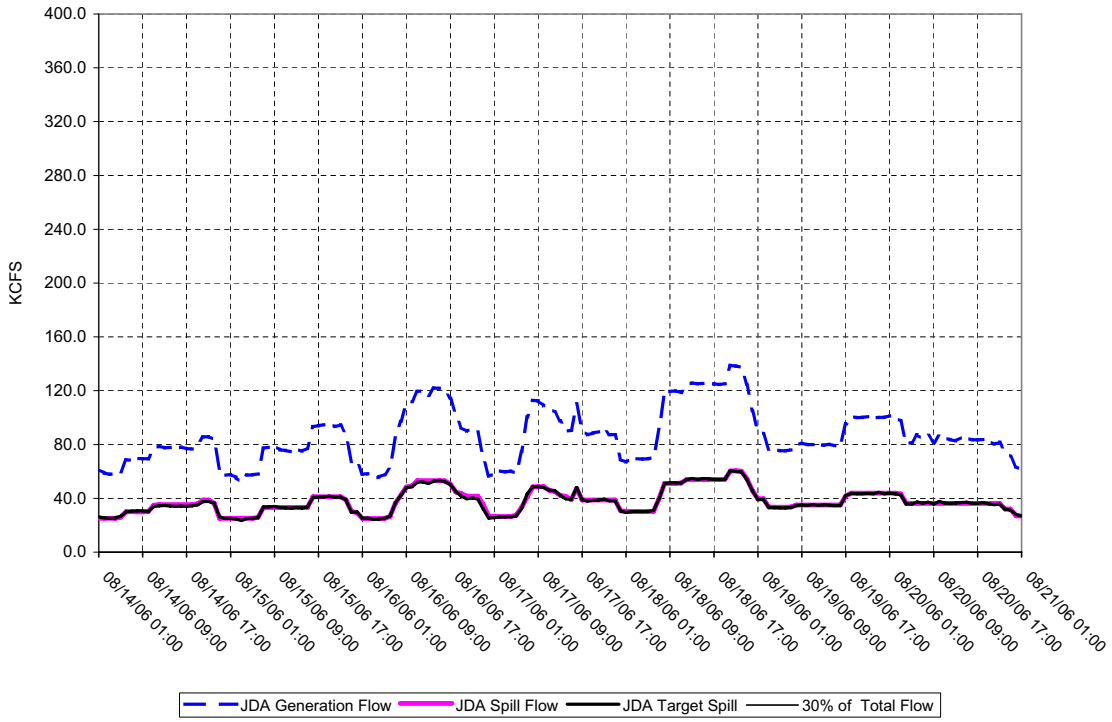
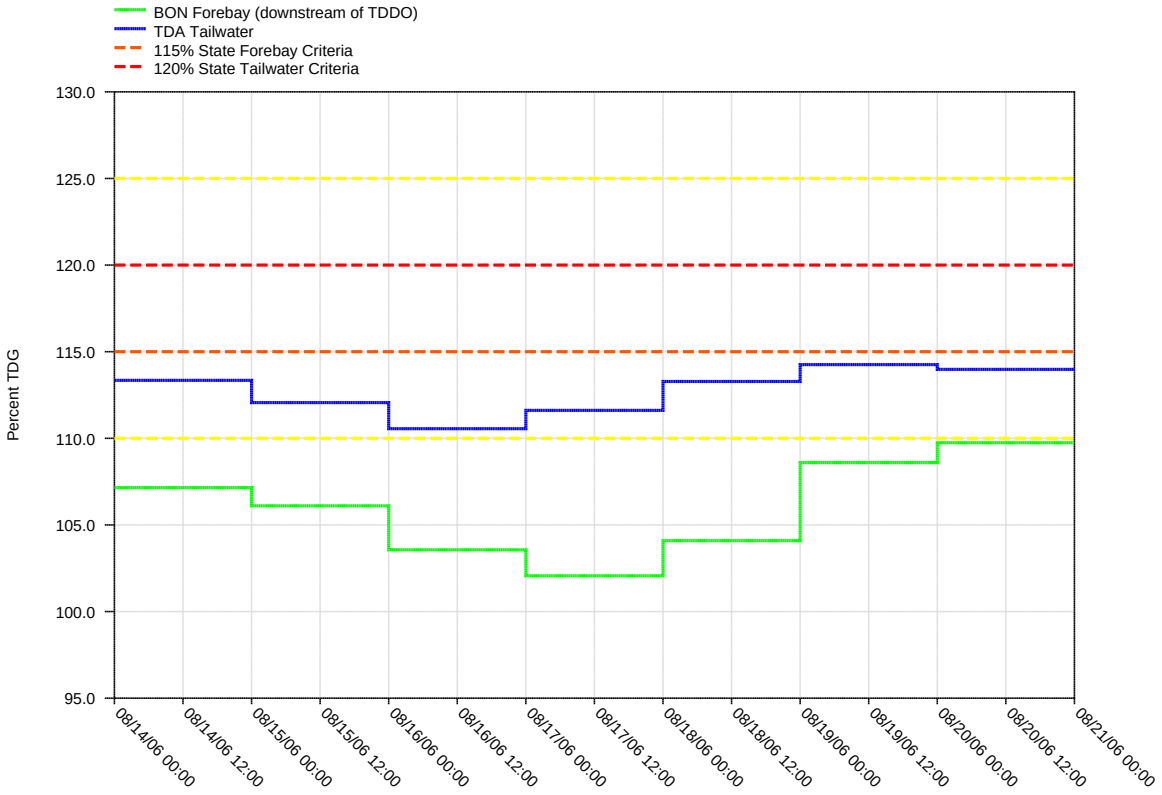


Figure 23.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

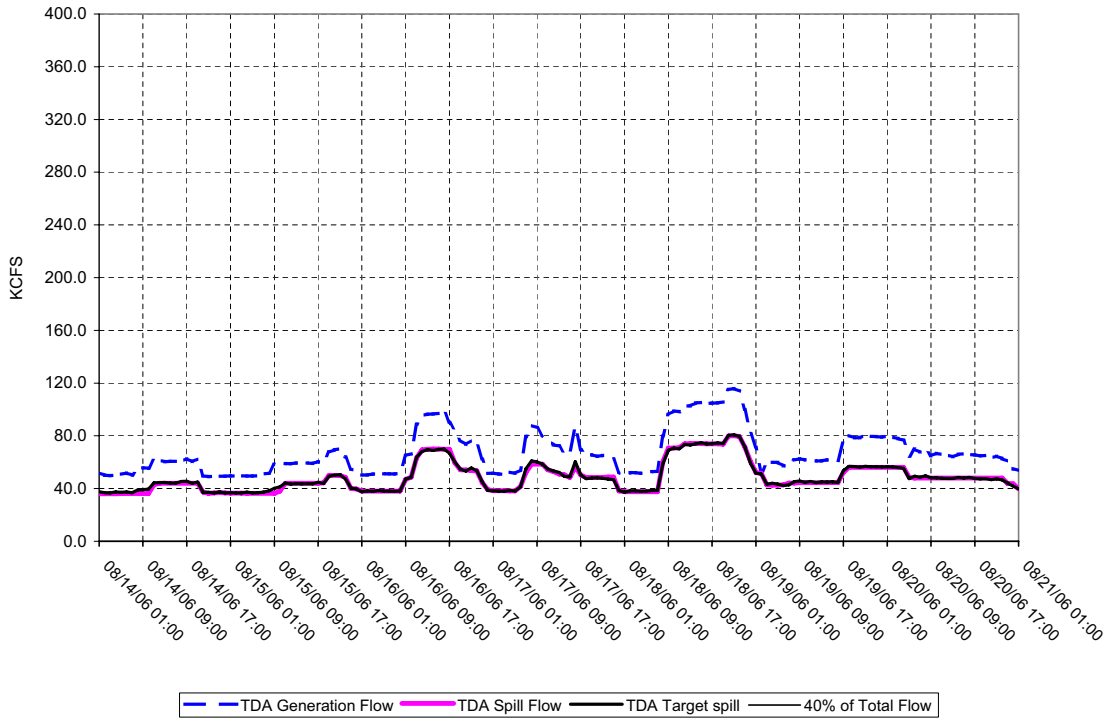
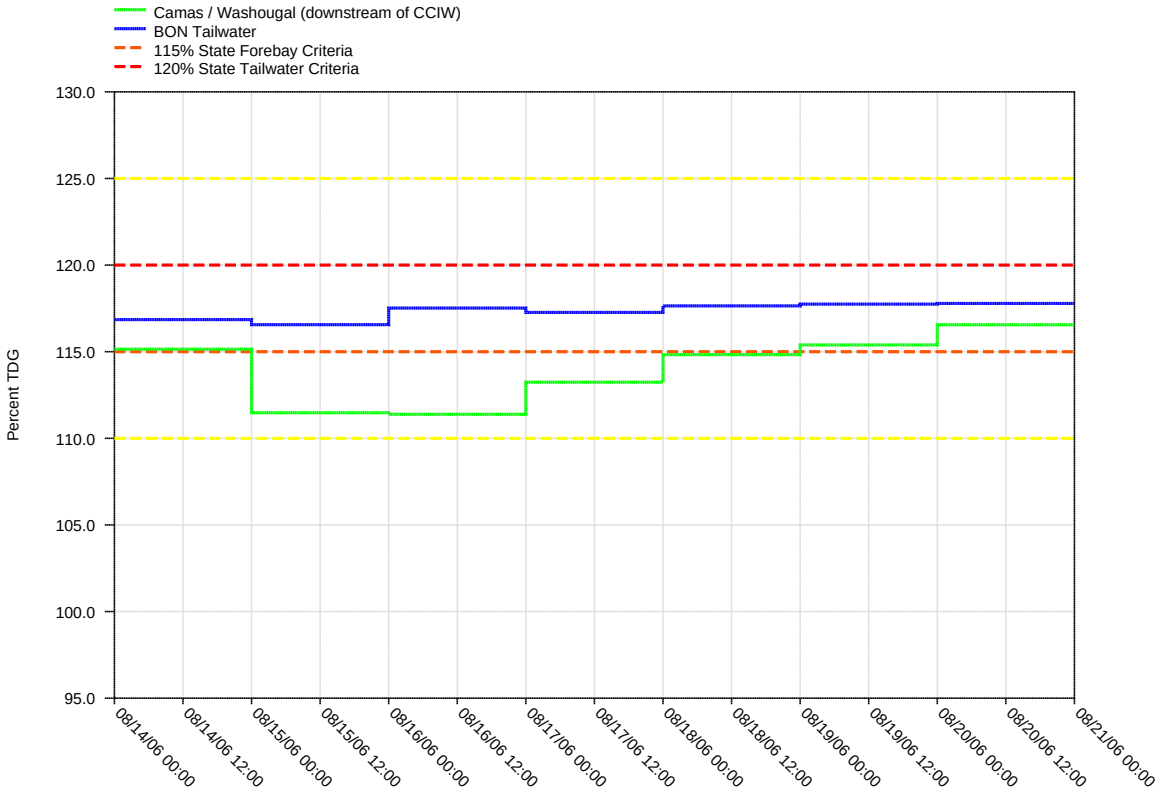


Figure 24.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

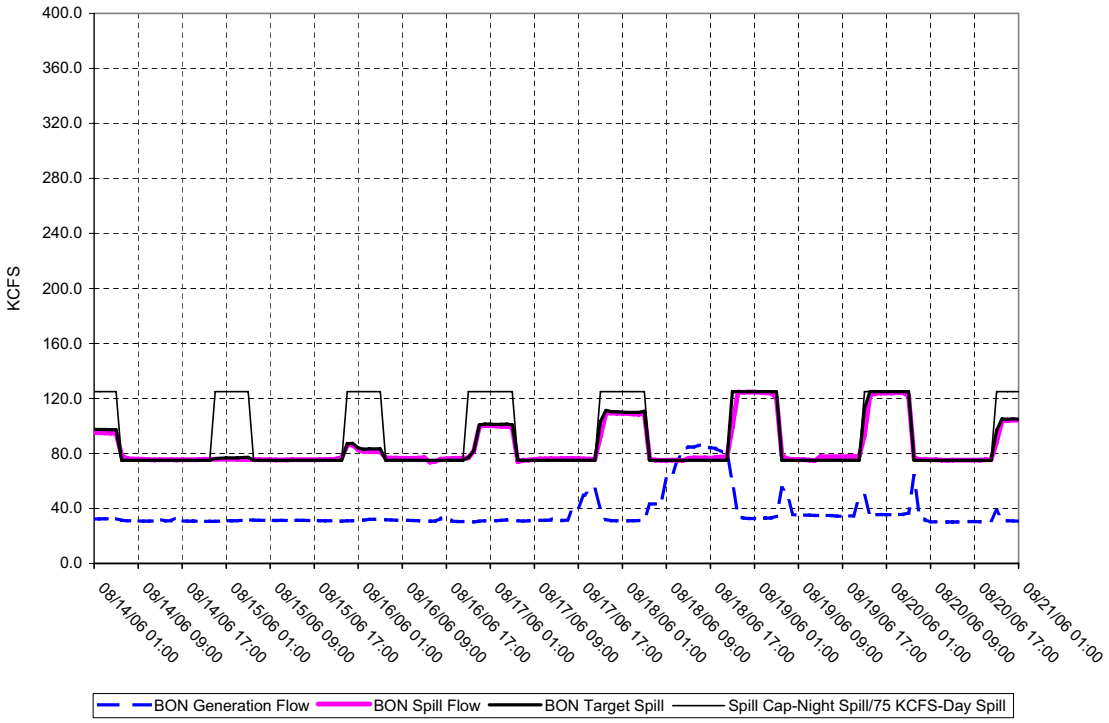
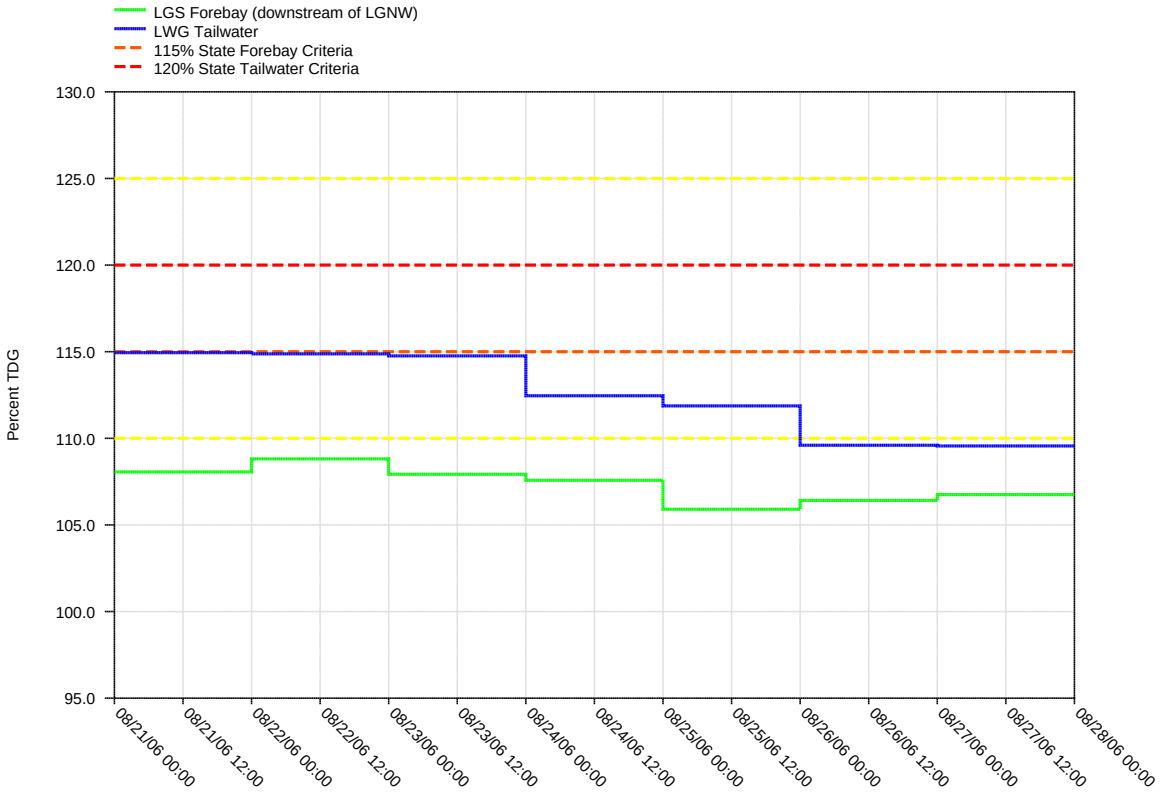


Figure 25.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

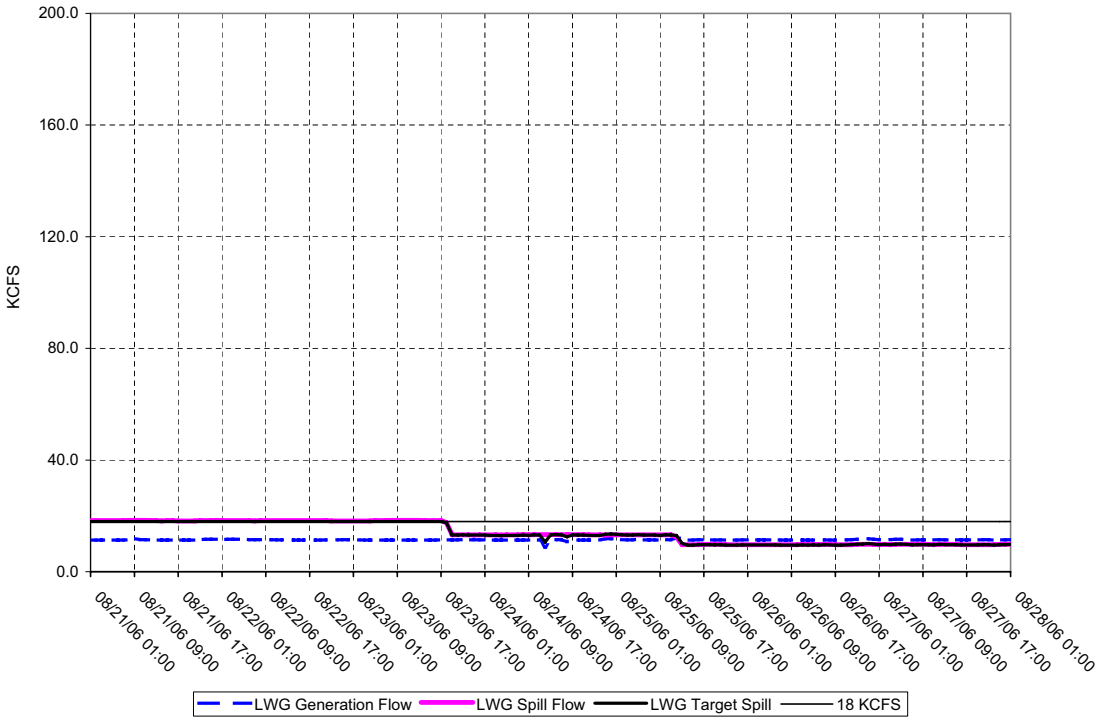
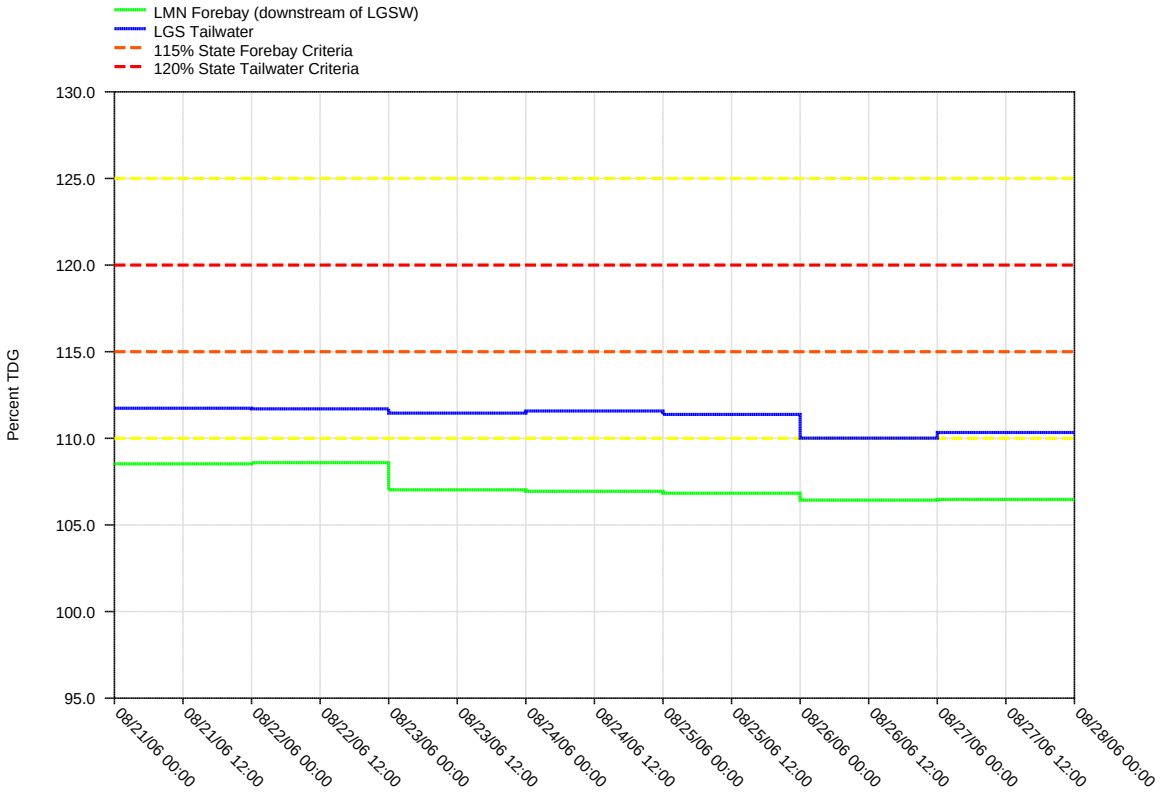


Figure 26.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

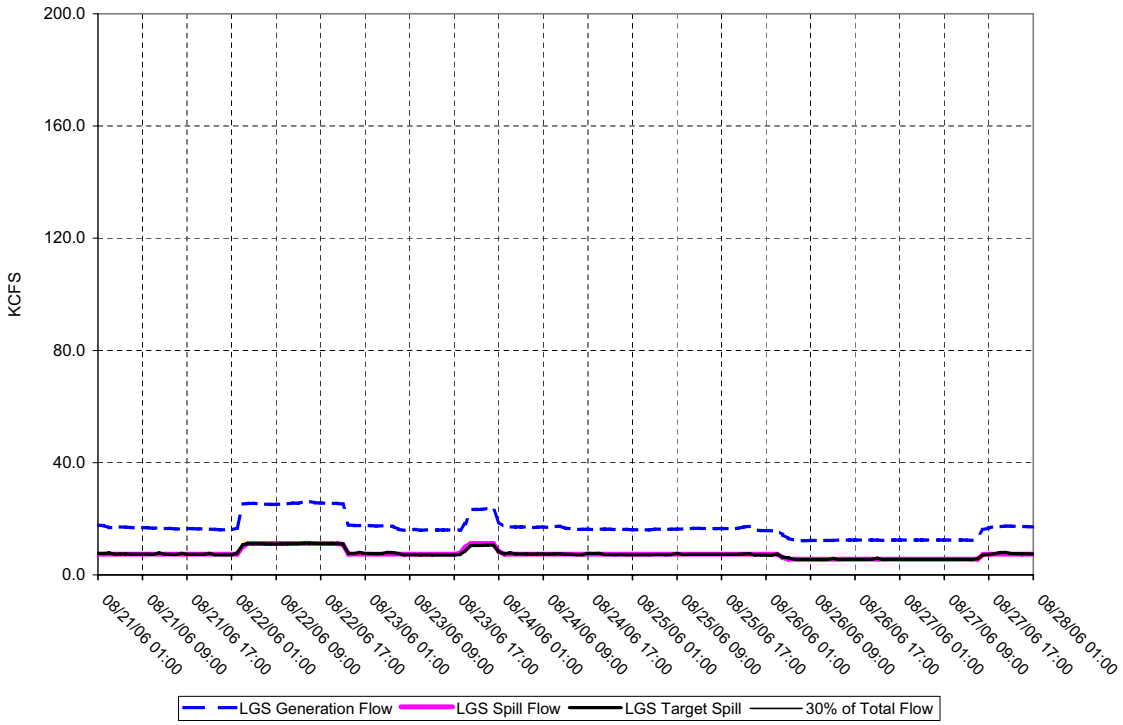
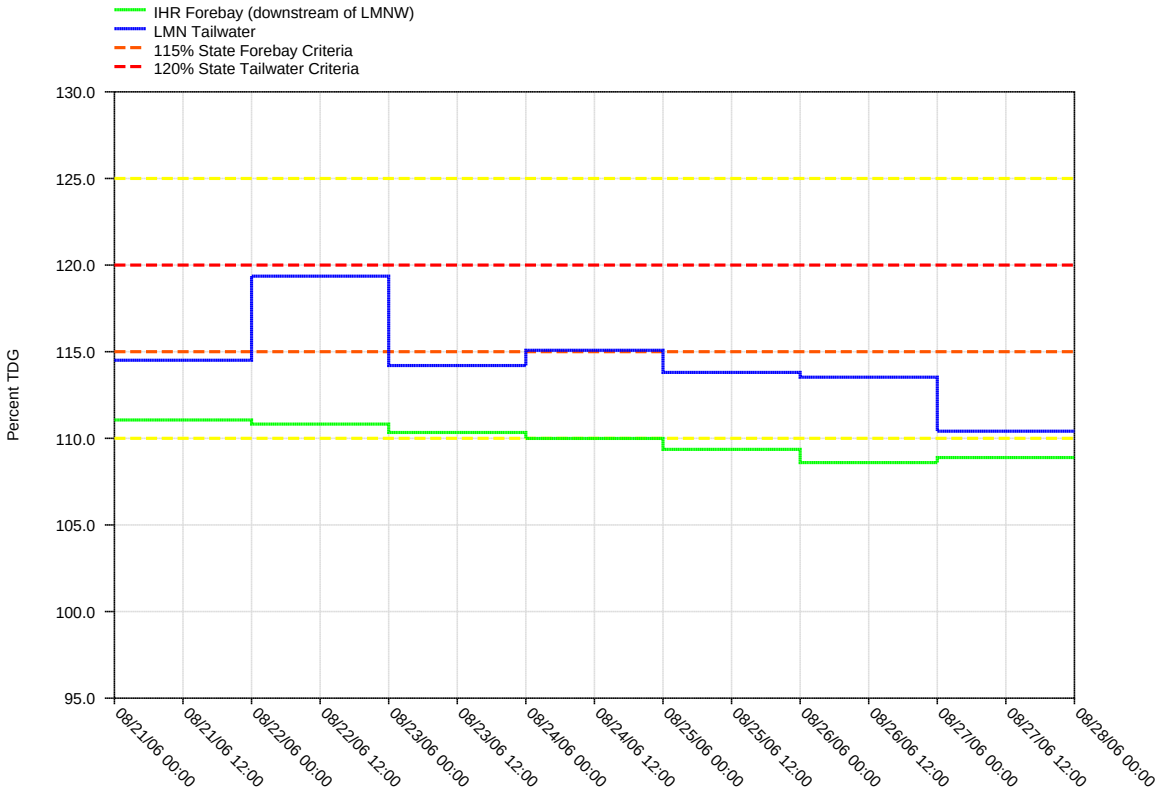


Figure 27.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

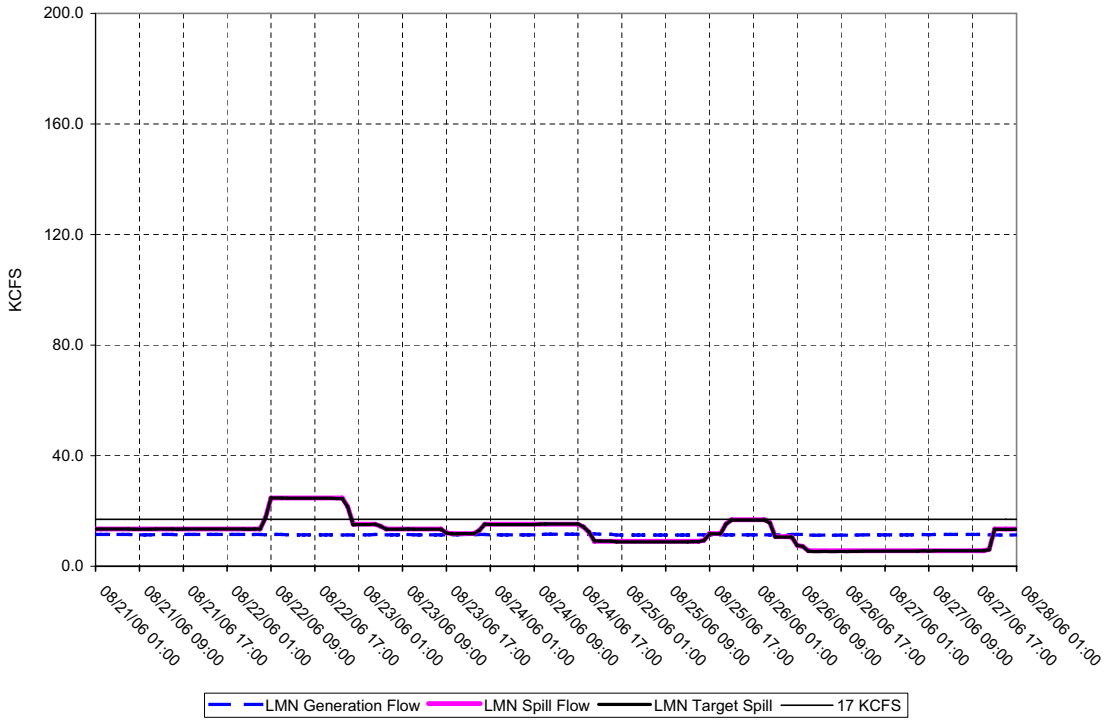
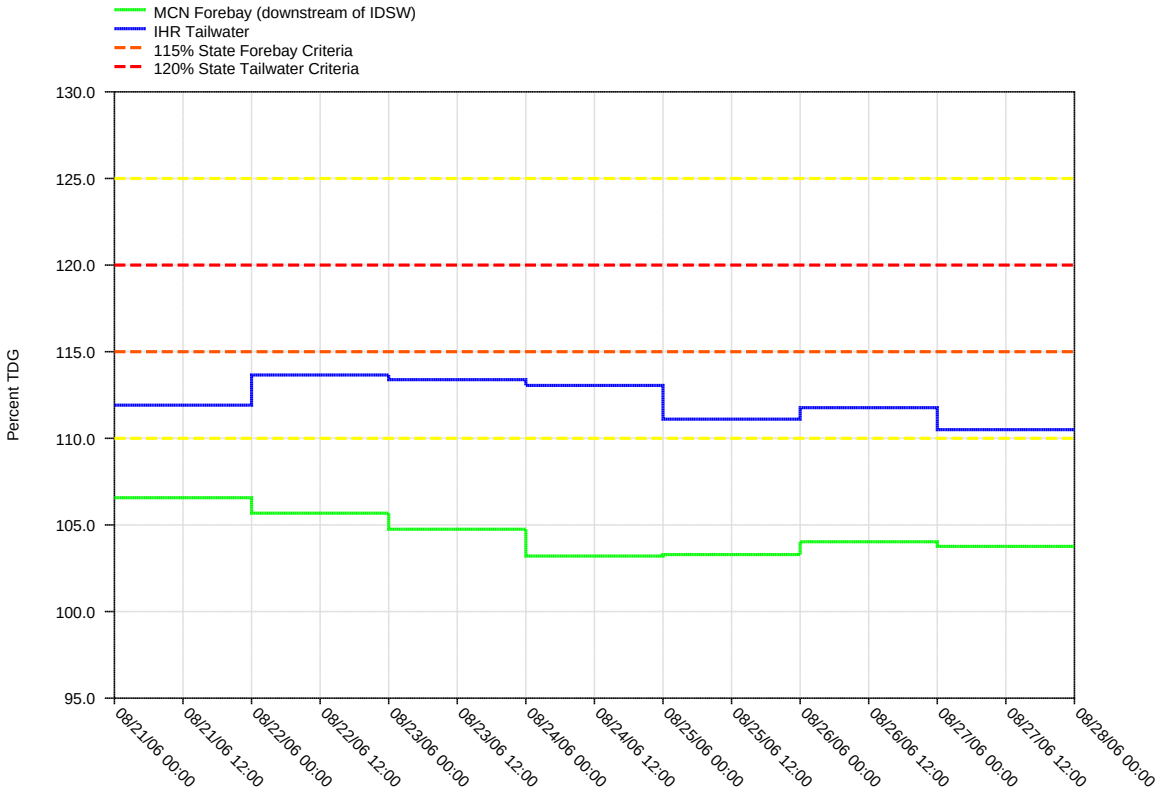


Figure 28.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

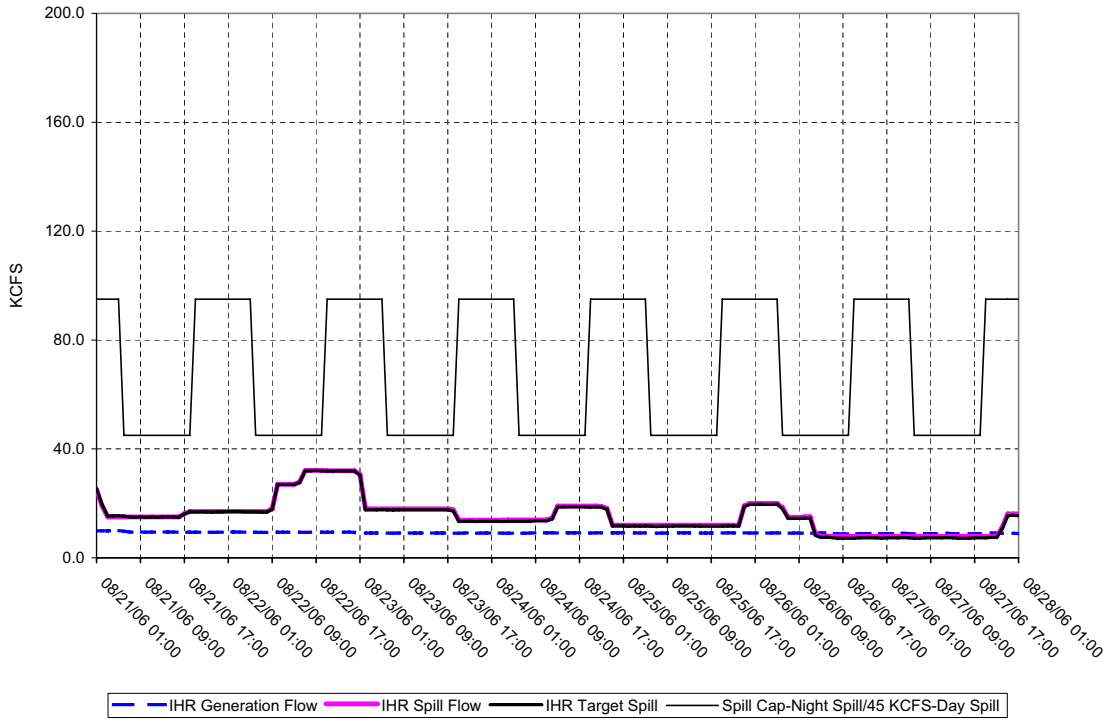
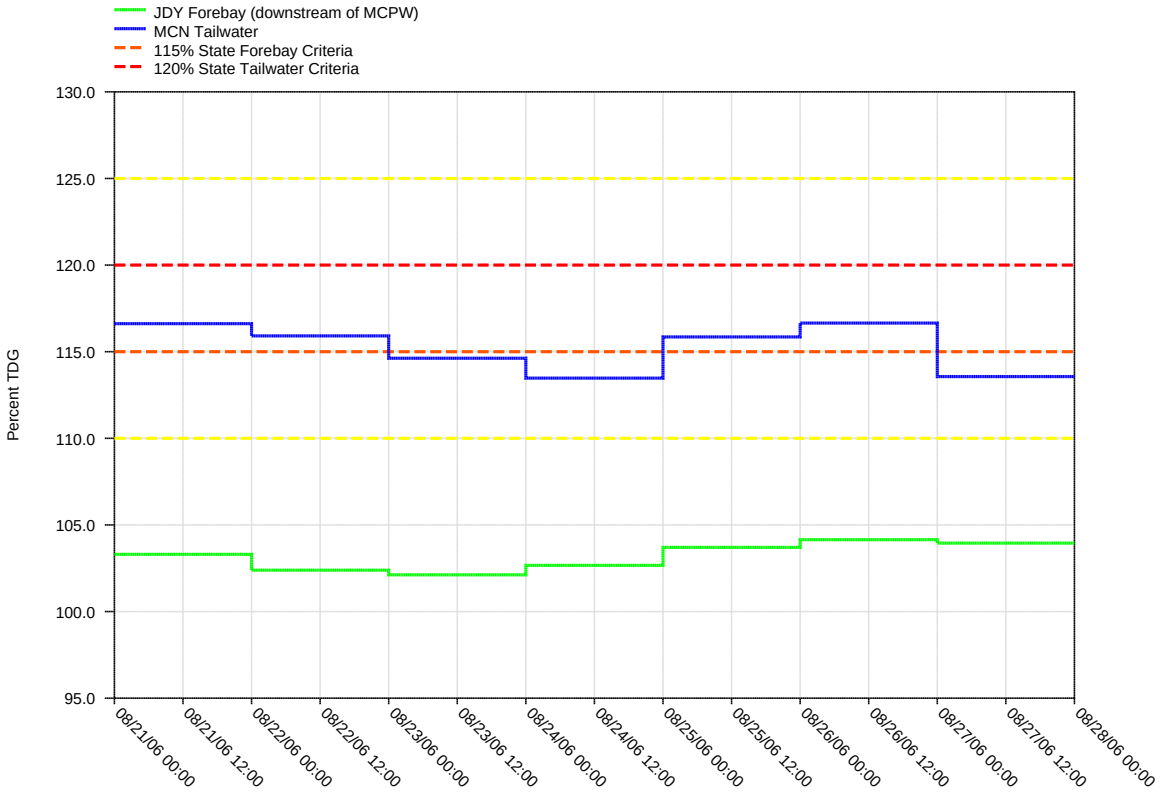


Figure 29.

Daily Average of High 12 Hourly % TDG Values for
McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

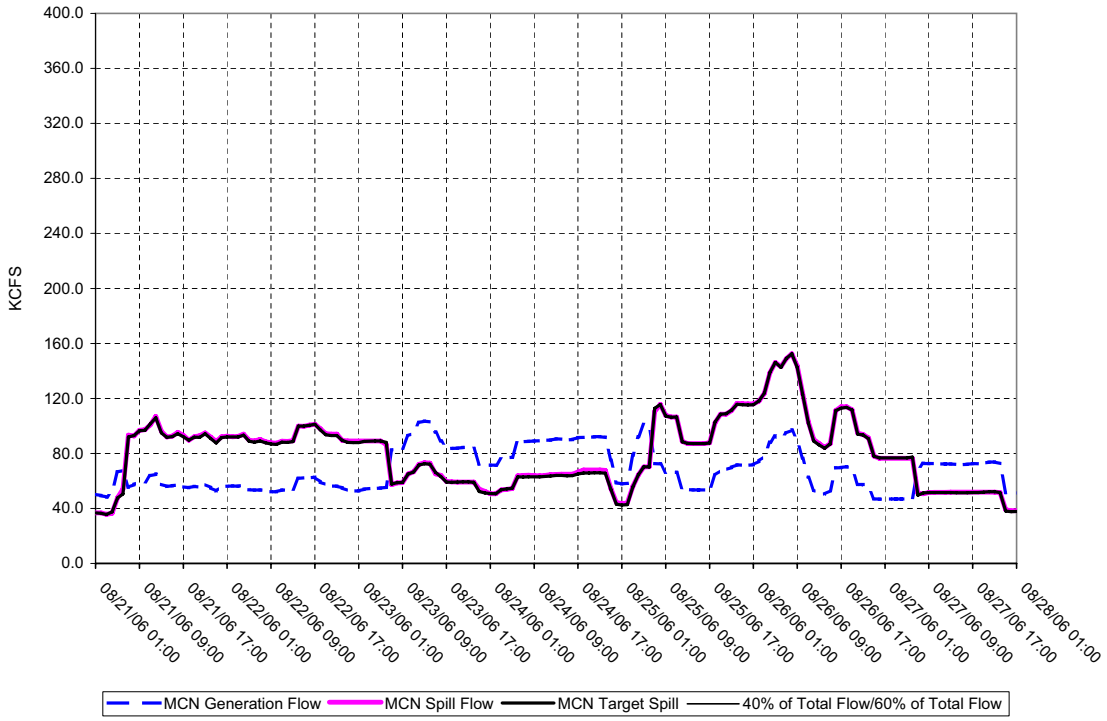
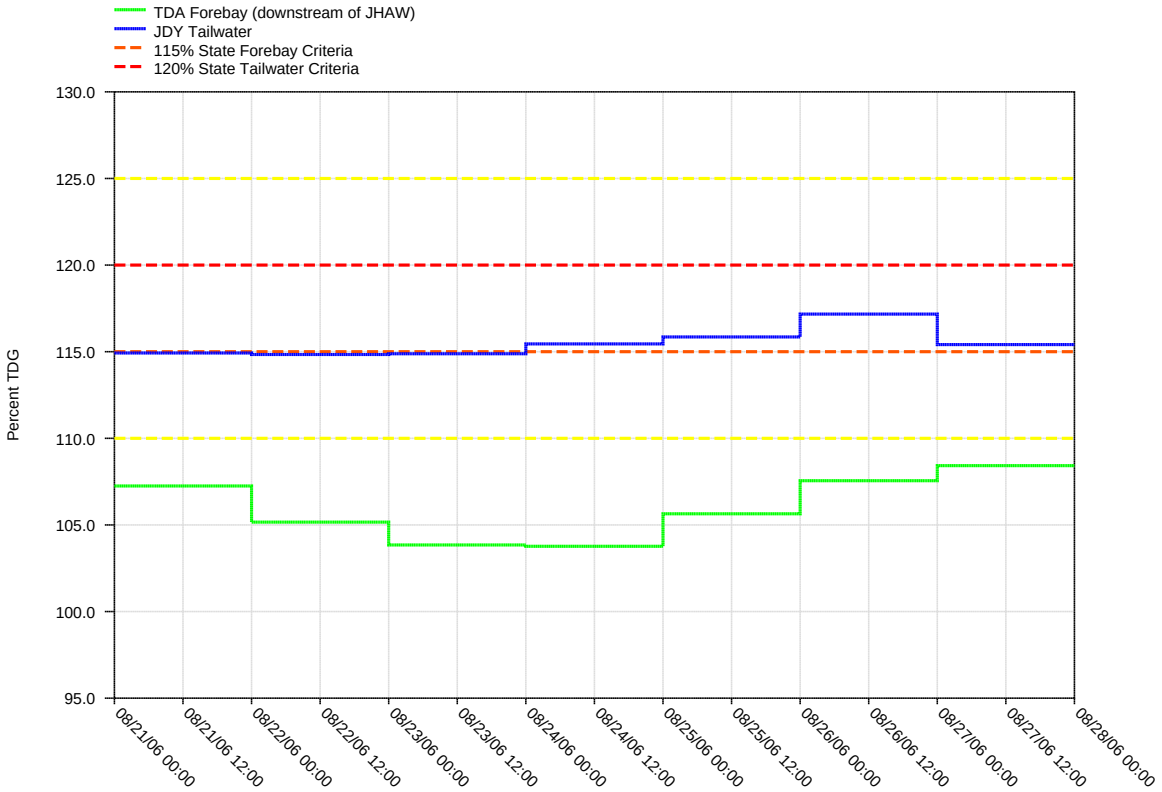


Figure 30.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

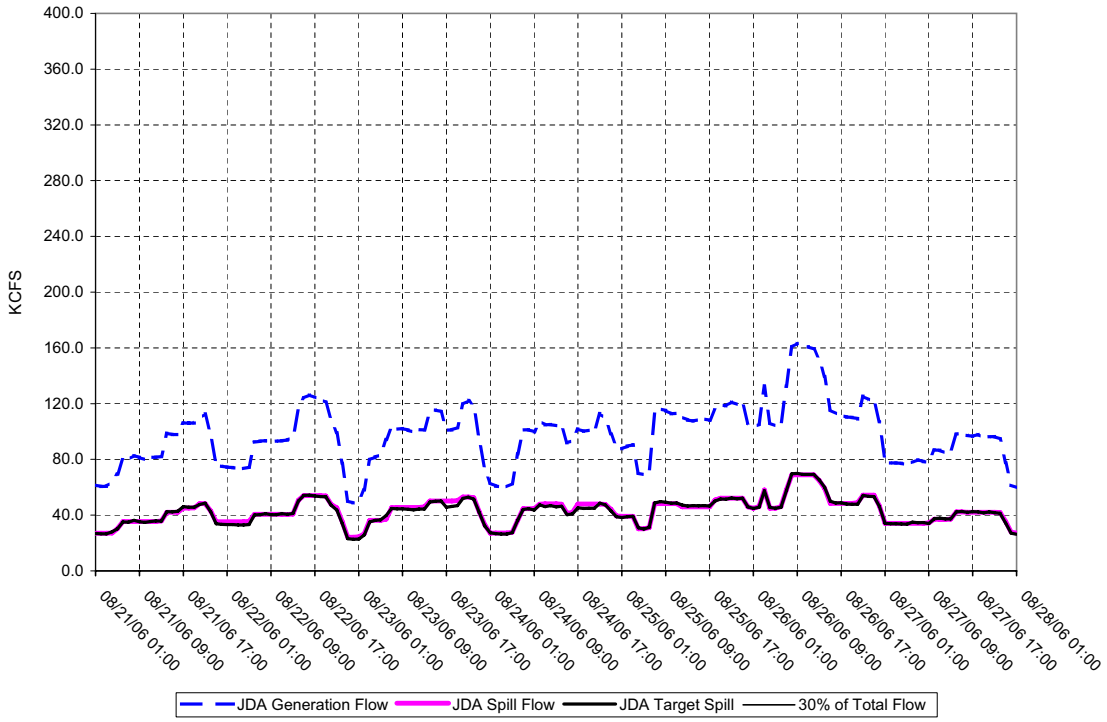
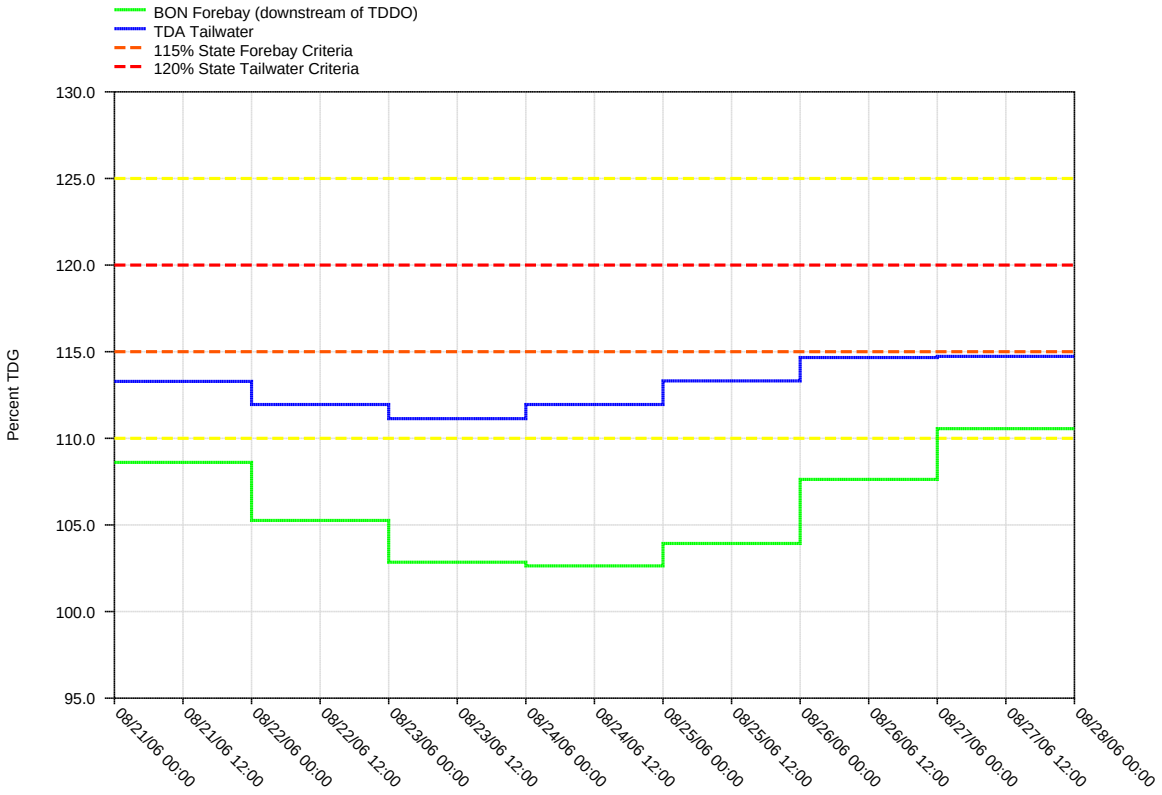


Figure 31.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

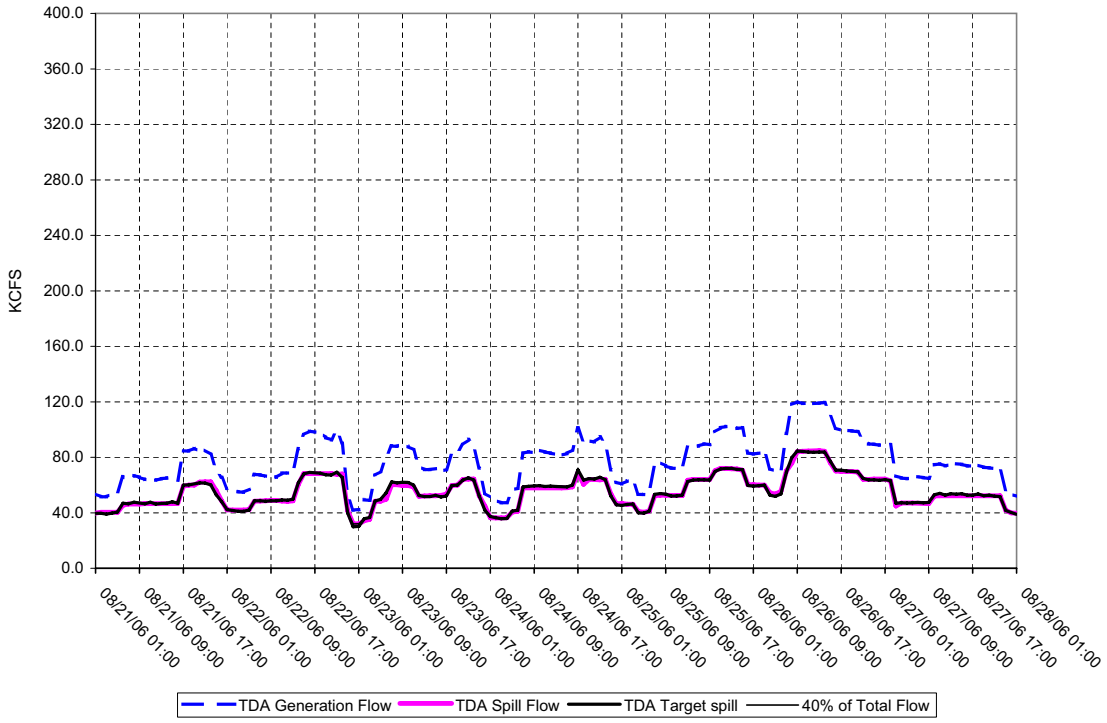
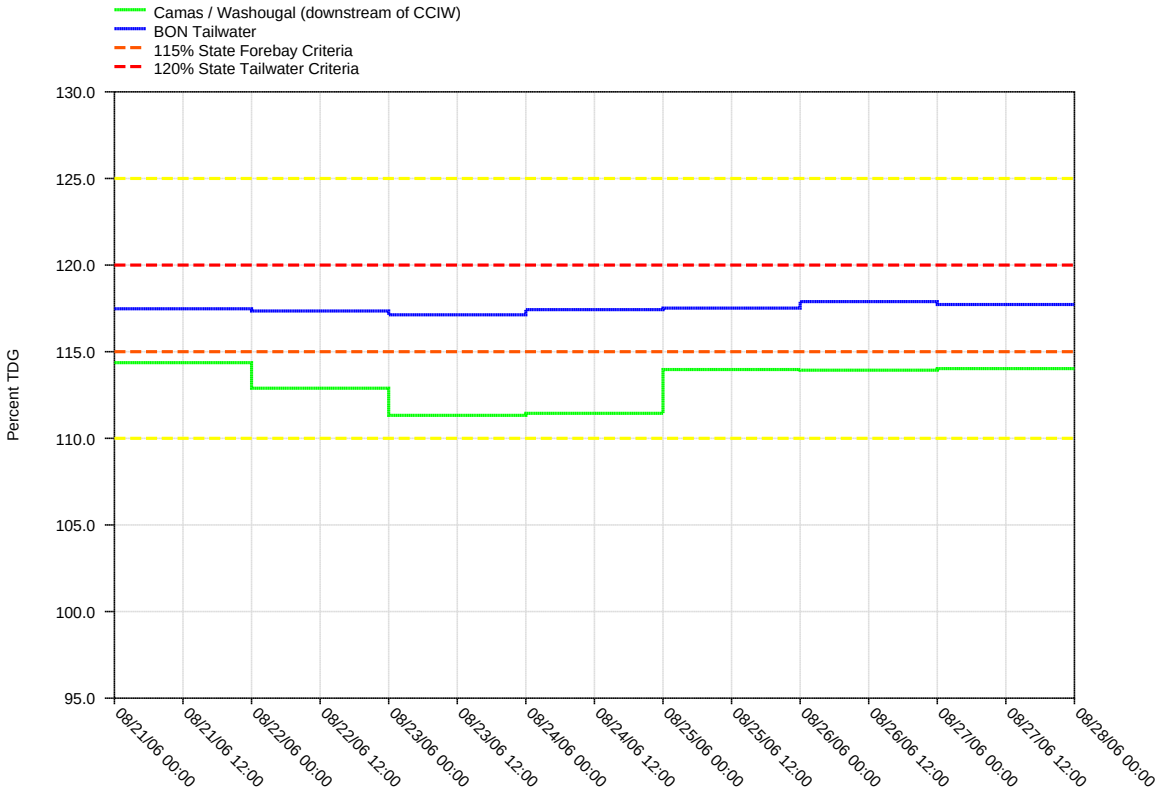


Figure 32.

Daily Average of High 12 Hourly % TDG Values for Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

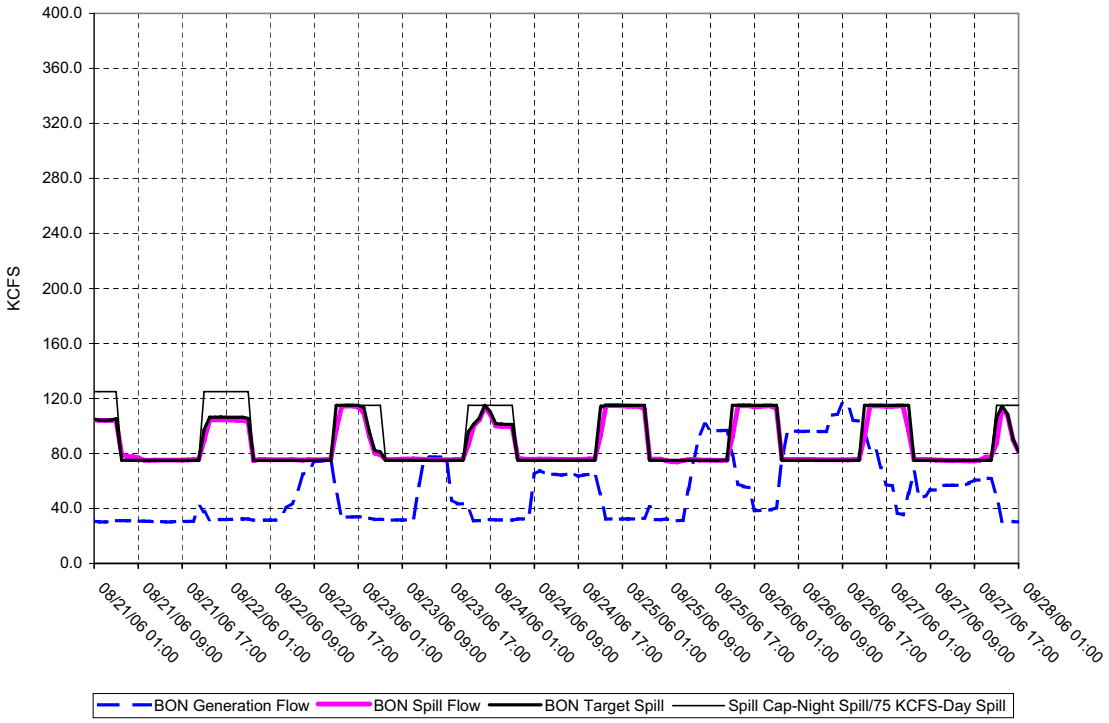
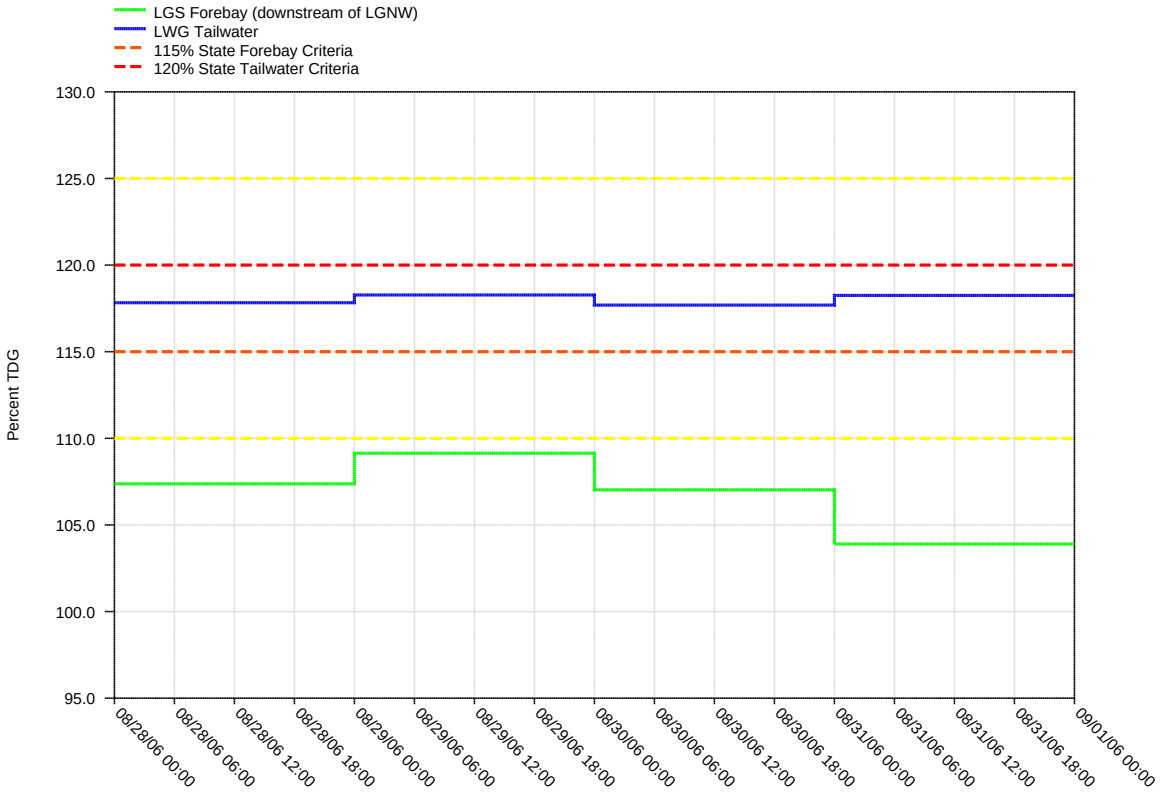


Figure 33.

Daily Average of High 12 Hourly % TDG Values for
Lower Granite Tailwater and Little Goose Forebay Projects



LOWER GRANITE DAM - Hourly Spill and Flow

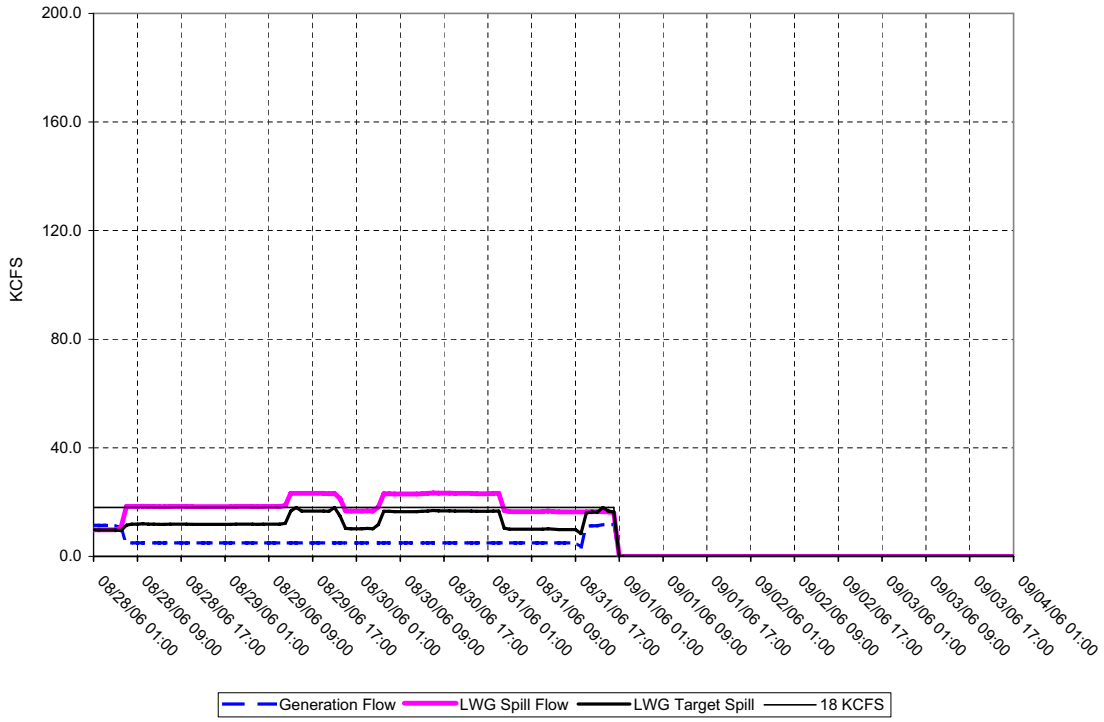
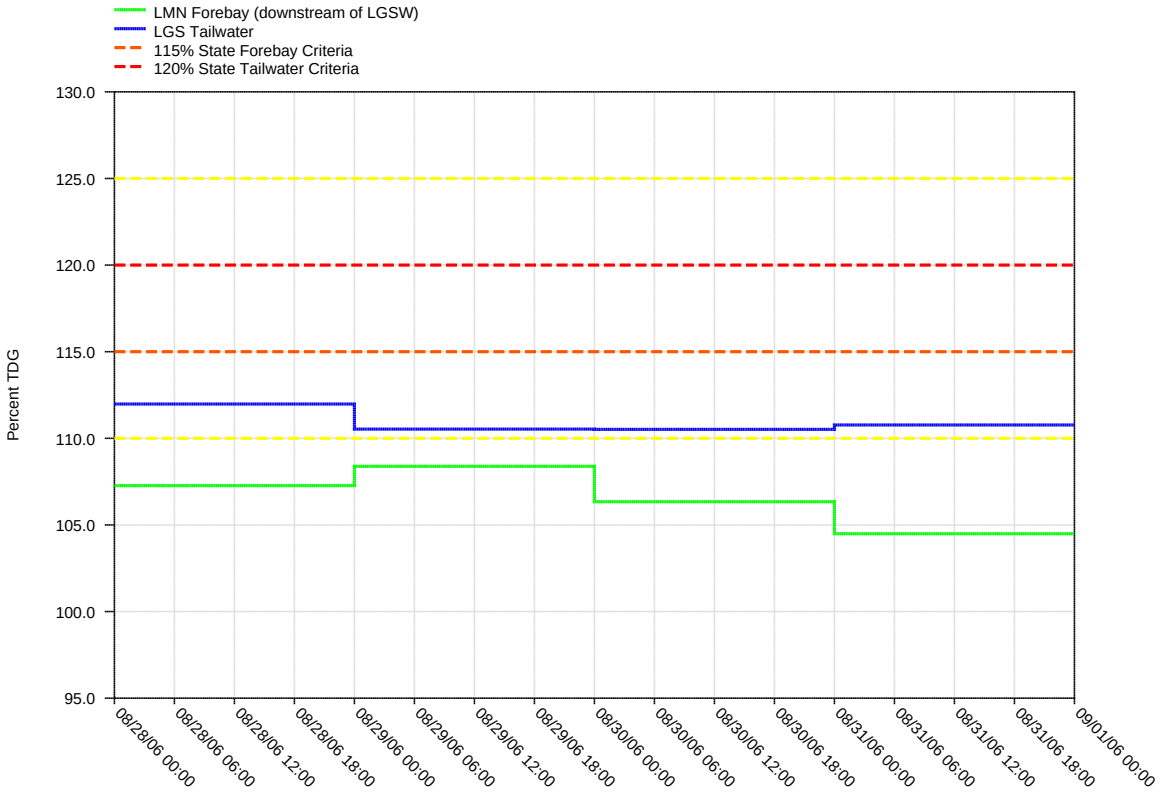


Figure 34.

Daily Average of High 12 Hourly % TDG Values for
Little Goose Tailwater and Lower Monumental Forebay Projects



LITTLE GOOSE DAM - Hourly Spill and Flow

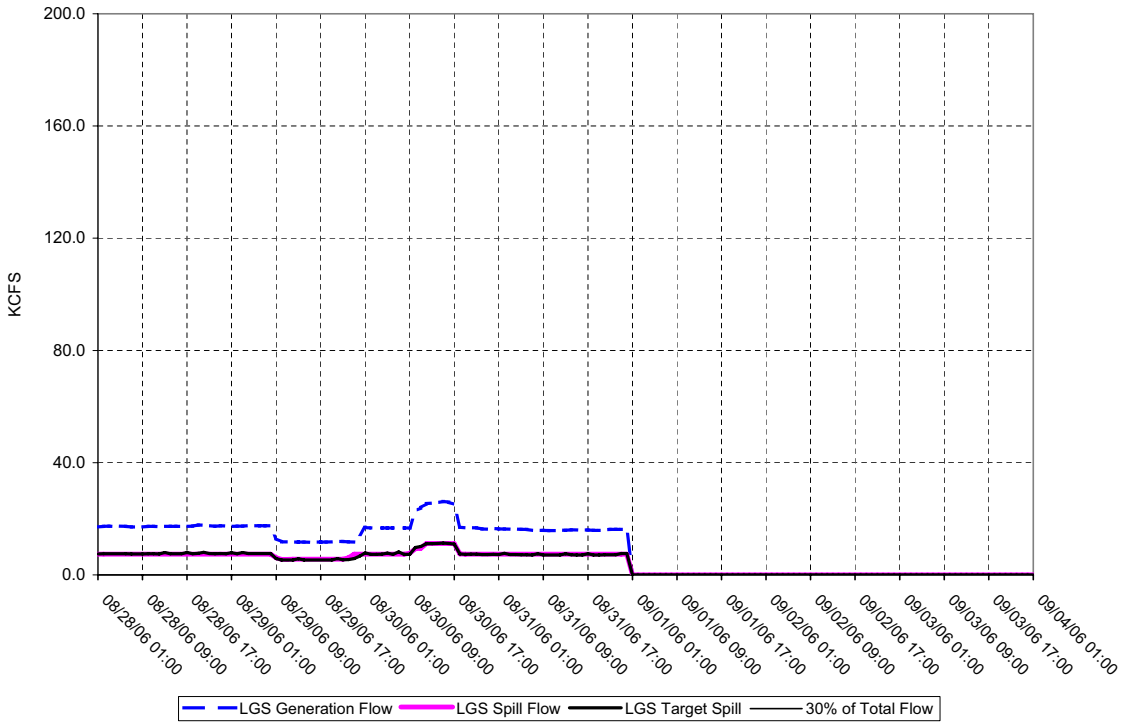
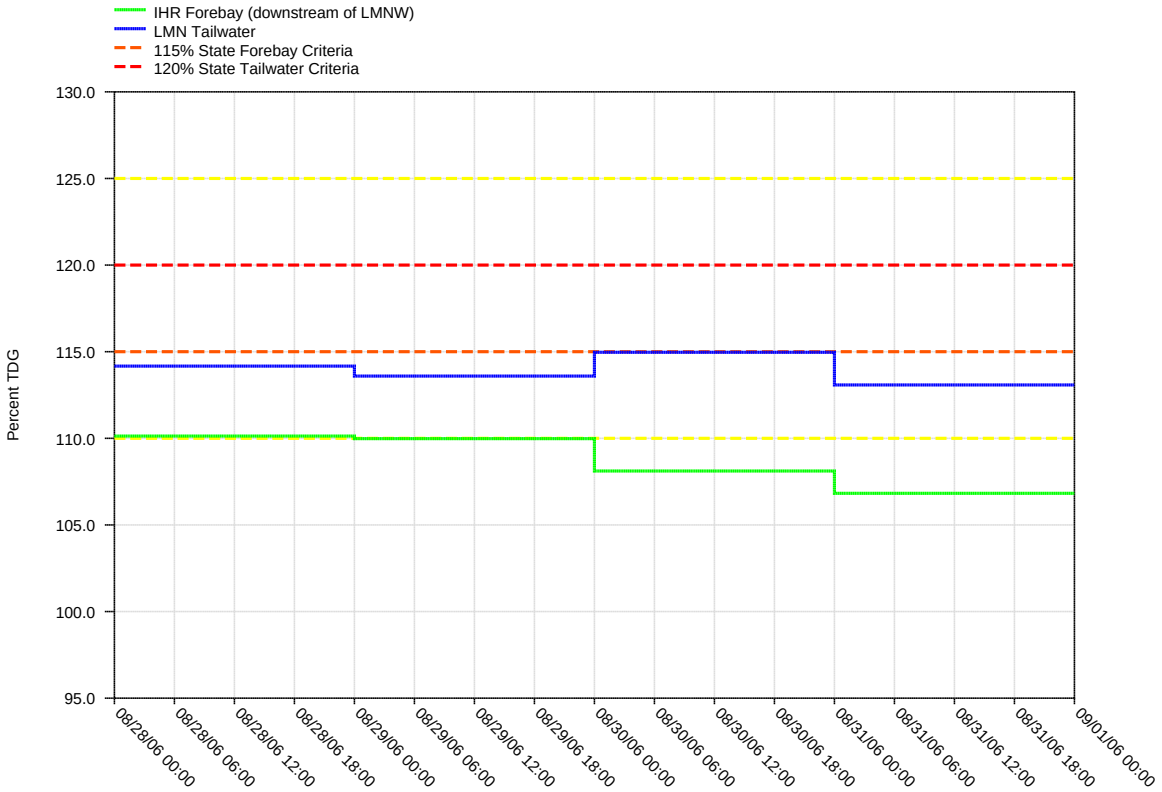


Figure 35.

Daily Average of High 12 Hourly % TDG Values for
Lower Monumental Tailwater and Ice Harbor Forebay Projects



LOWER MONUMENTAL DAM - Hourly Spill and Flow

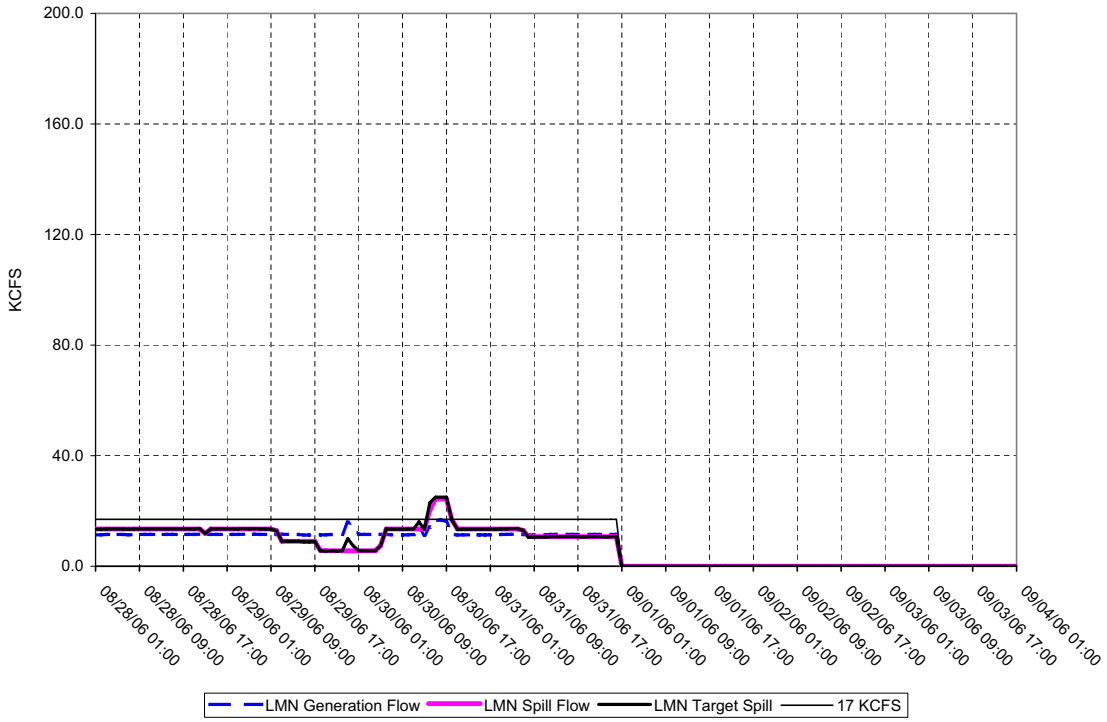
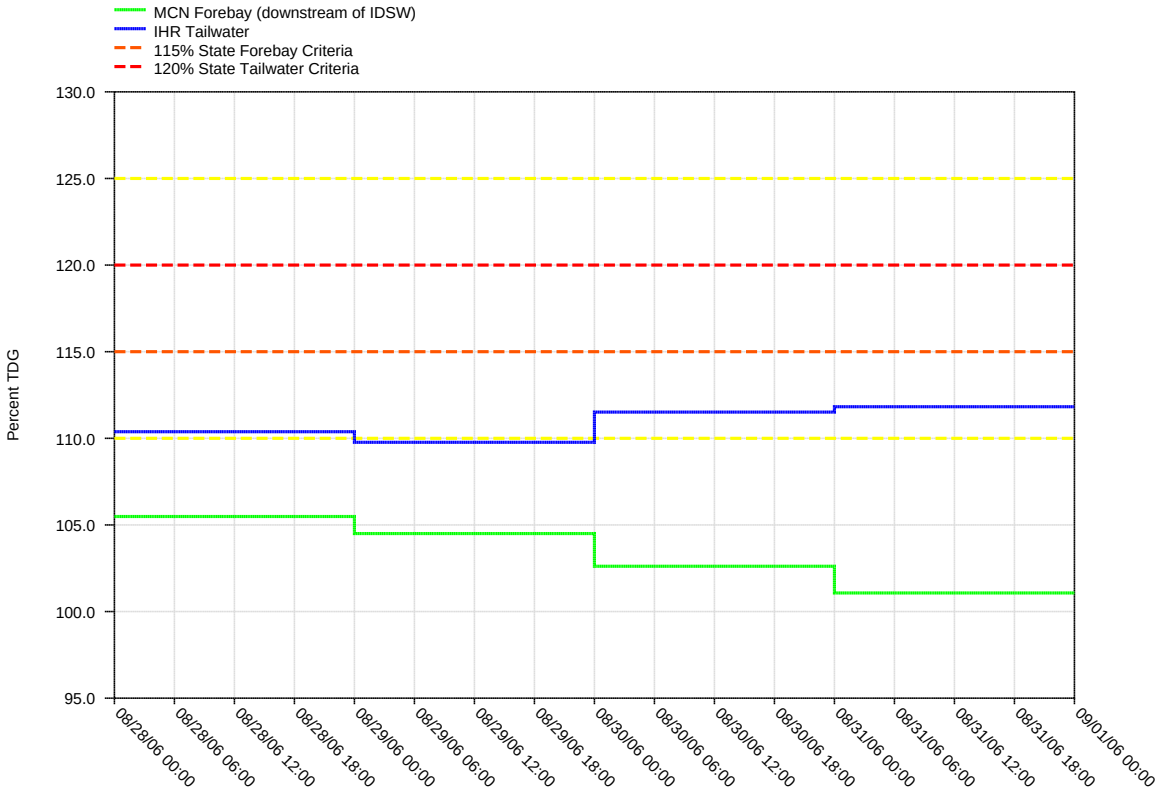


Figure 36.

Daily Average of High 12 Hourly % TDG Values for
Ice Harbor Tailwater and McNary Forebay Projects



ICE HARBOR DAM - Hourly Spill and Flow

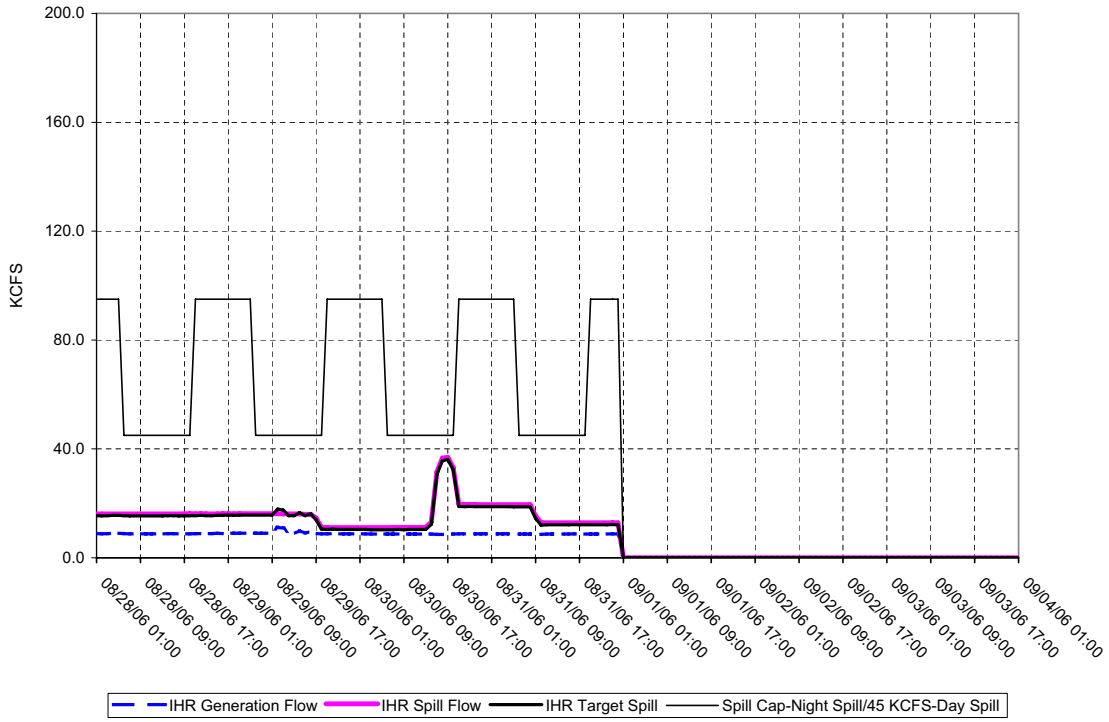
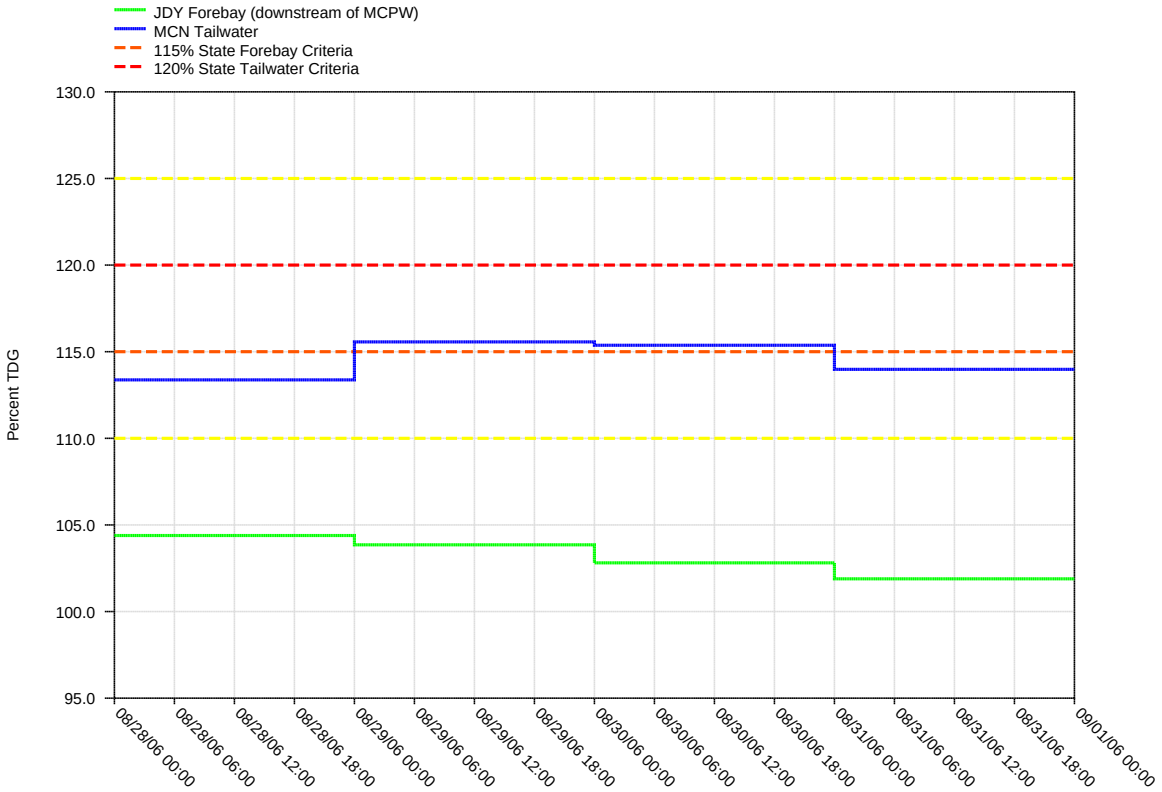


Figure 37.

Daily Average of High 12 Hourly % TDG Values for McNary Tailwater and John Day Forebay Projects



McNARY DAM - Hourly Spill and Flow

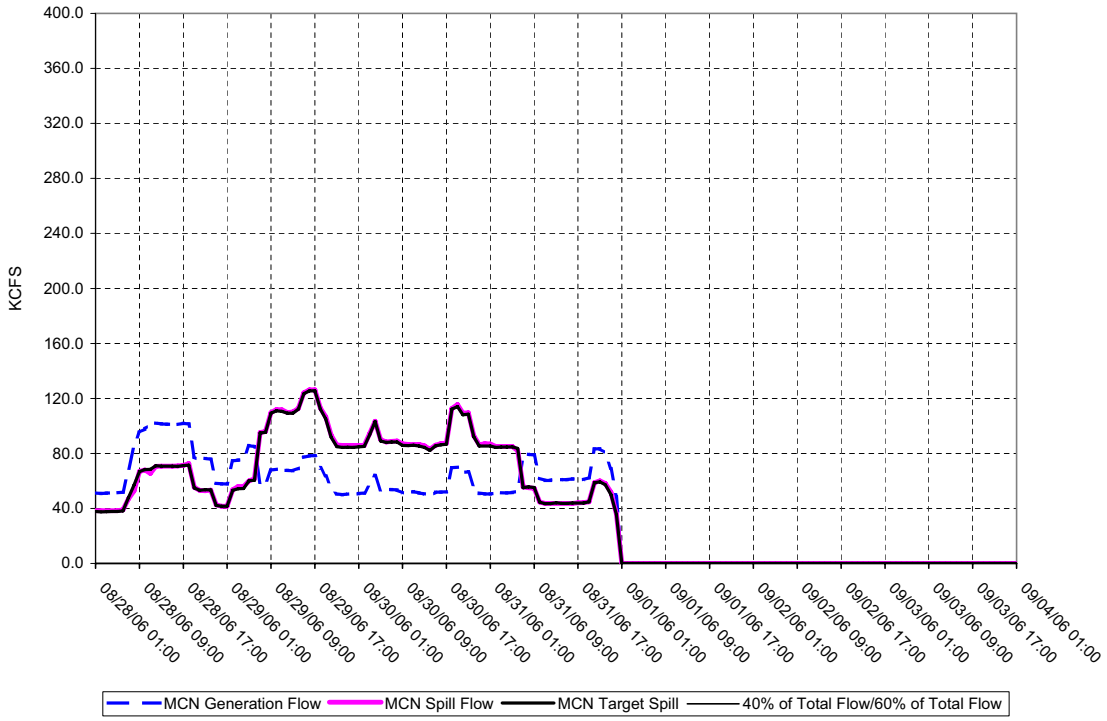
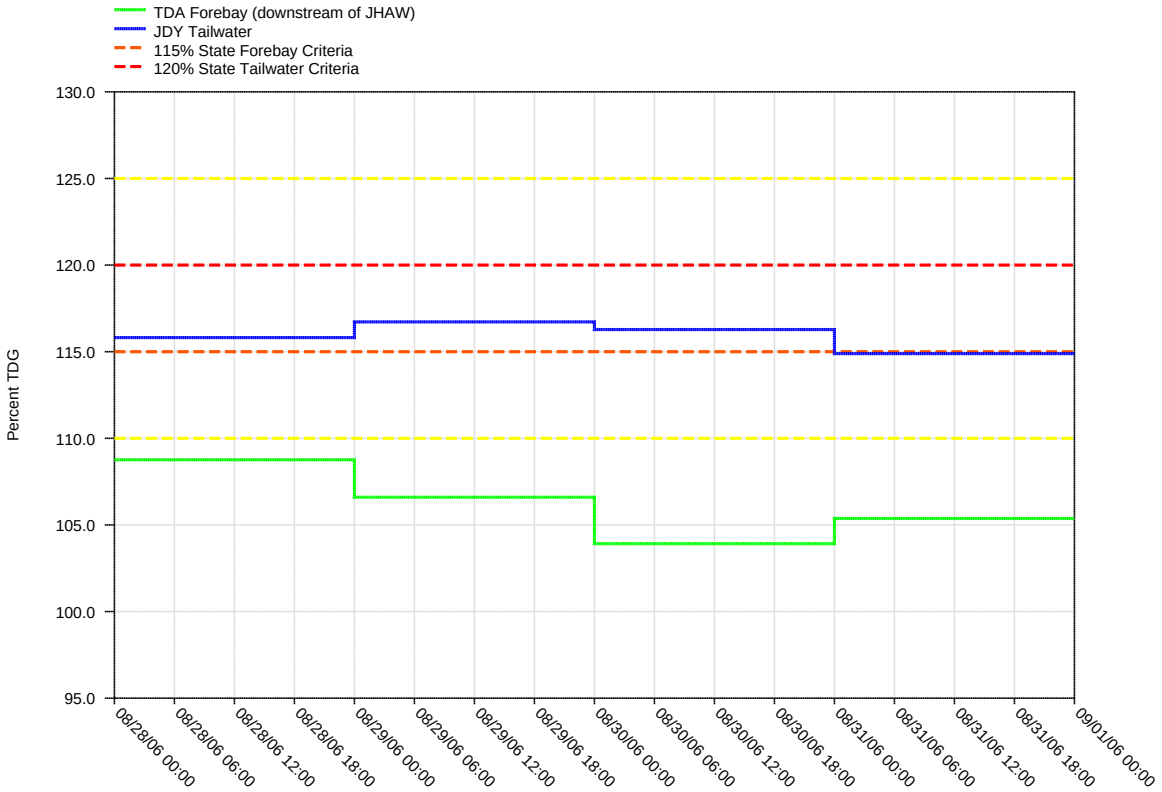


Figure 38.

Daily Average of High 12 Hourly % TDG Values for
John Day Tailwater and The Dalles Forebay Projects



JOHN DAY DAM - Hourly Spill and Flow

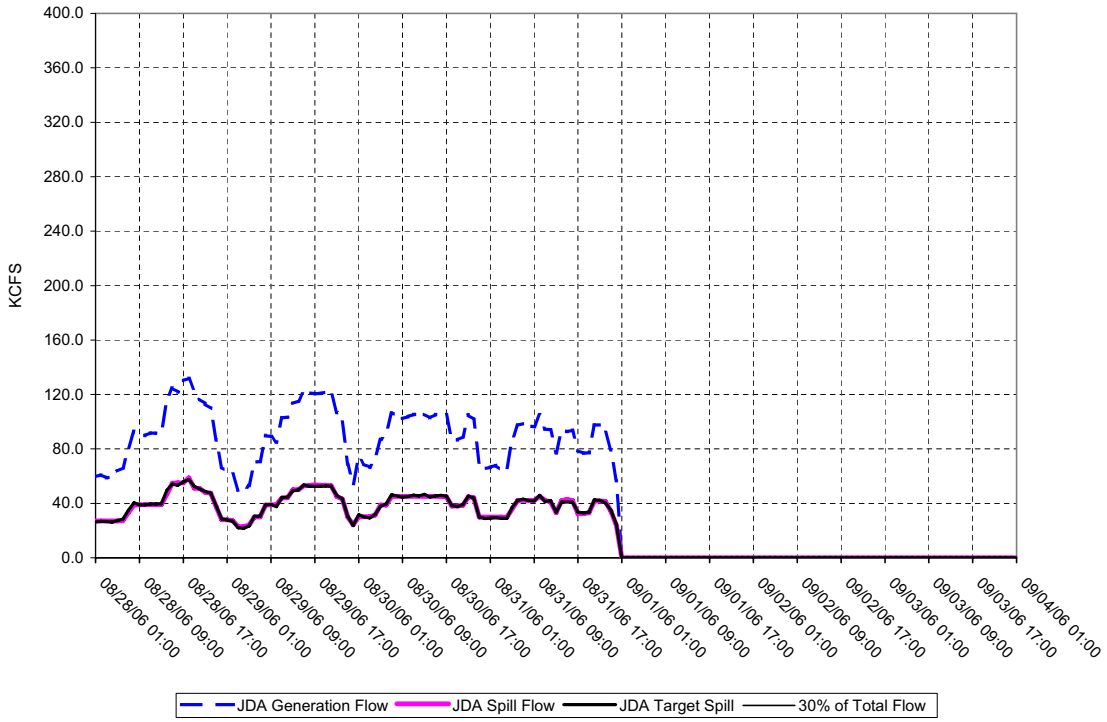
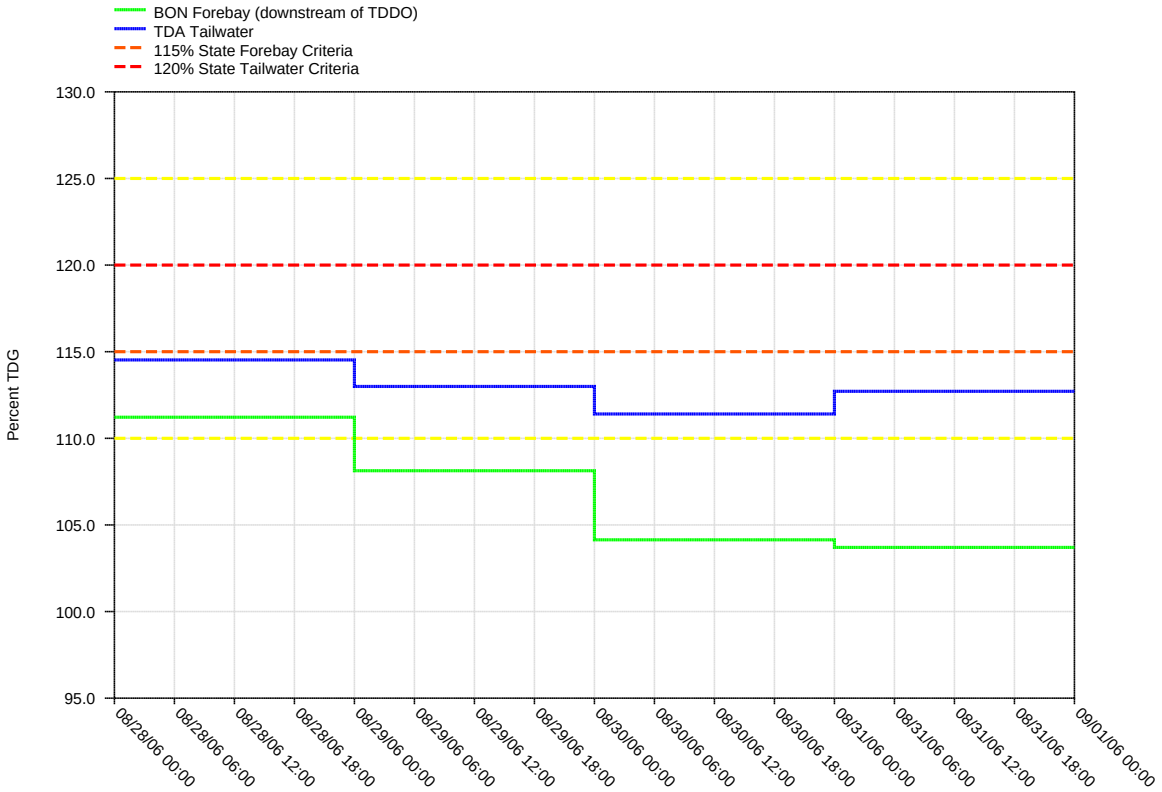


Figure 39.

Daily Average of High 12 Hourly % TDG Values for
The Dalles Tailwater and Bonneville Forebay Projects



THE DALLES DAM - Hourly Spill and Flow

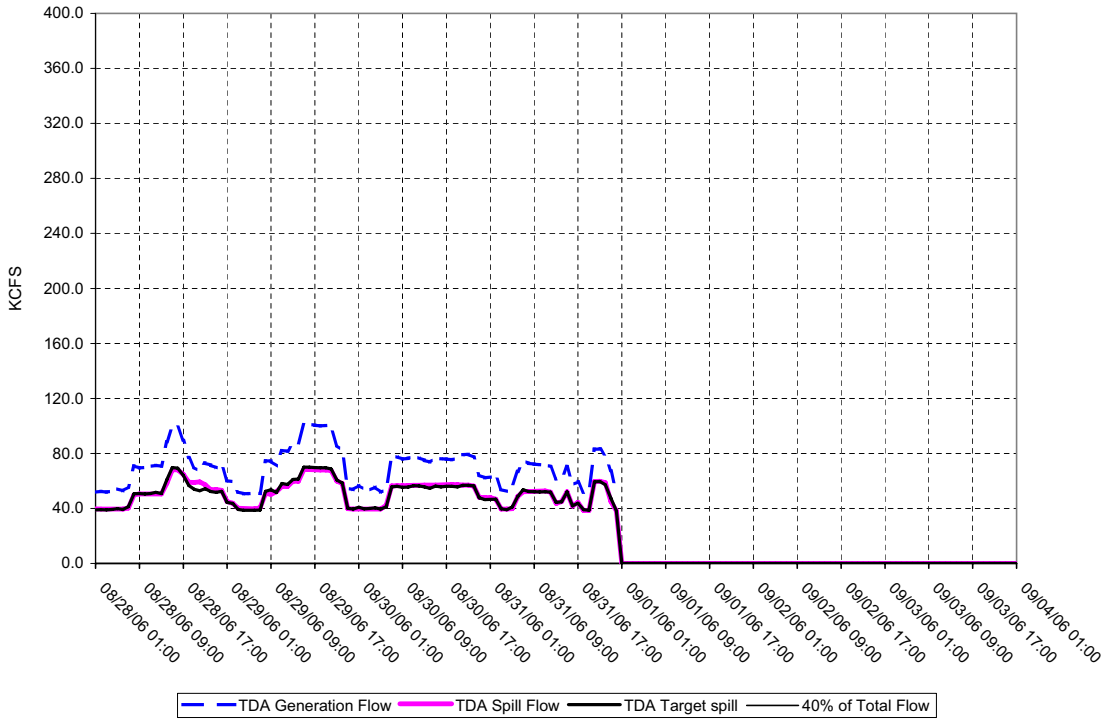
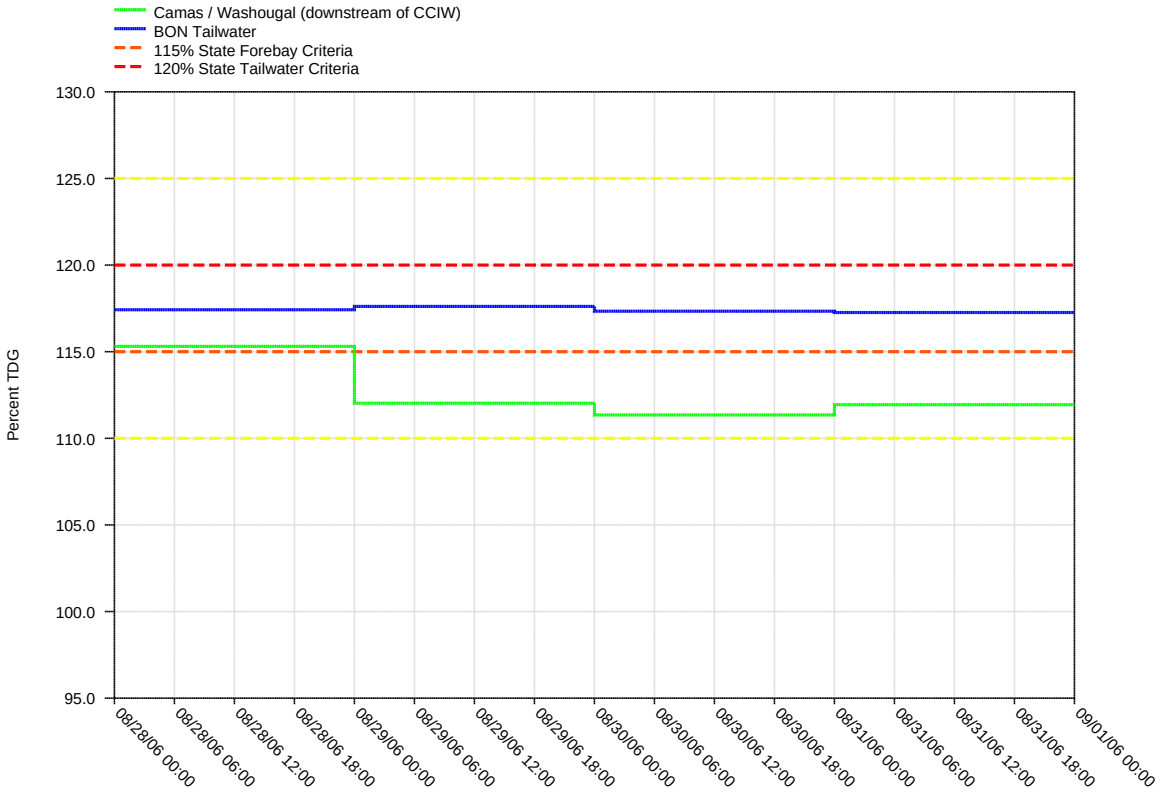


Figure 40.

Daily Average of High 12 Hourly % TDG Values for
Bonneville Tailwater and Camas / Washougal



BONNEVILLE DAM - Hourly Spill and Flow

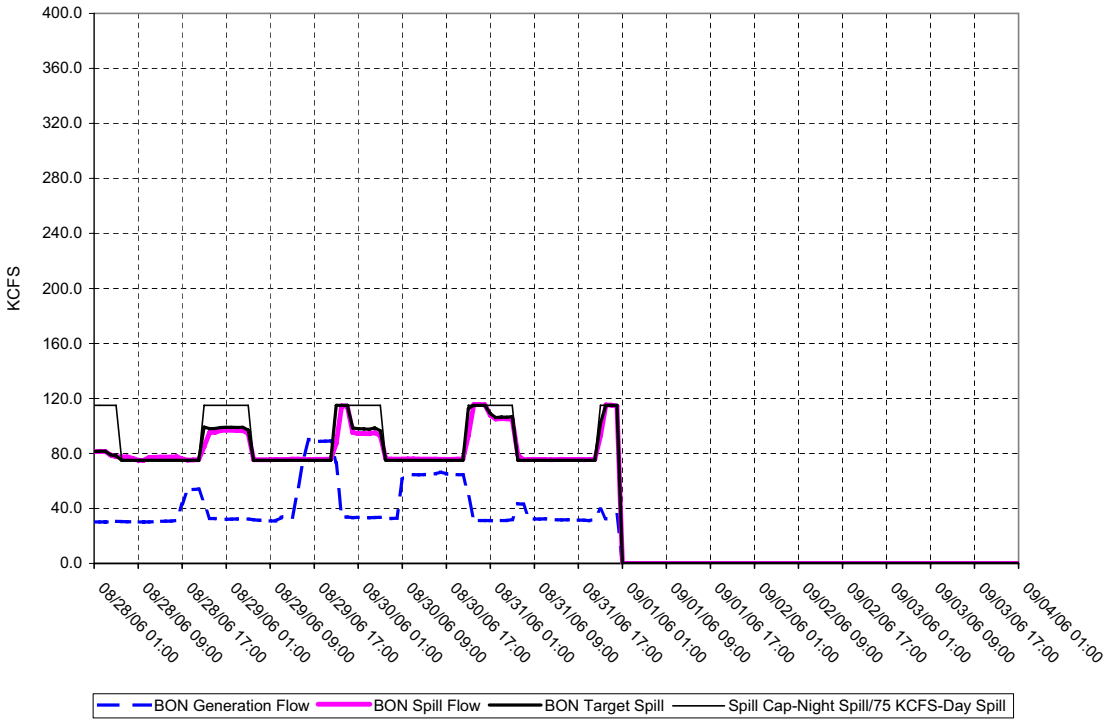


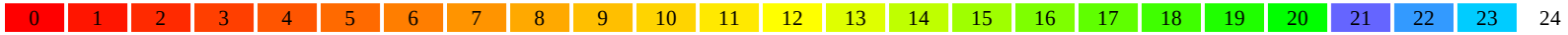
Table 1.

Average percent TDG for 12 highest hours – July 31 and August 2006

Date	LWG	LGNW	LGSA	LGSW	LMNA	LMNW	IHRA	IDSW	MCNA	MCPW	JDY	JHAW	TDA	TDDO	BON	CCIW	CWMW
Gas Cap %	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115	120	115
07/31/2006	103.3	114.0	105.6	110.8	105.5	115.9	106.3	113.3	102.9	112.6	102.8	113.3	105.9	112.6	105.2	117.3	113.3
08/01/2006	102.2	110.7	104.8	110.6	105.4	115.6	106.0	112.8	104.1	114.9	101.9	114.9	105.6	112.1	104.9	117.3	112.2
08/02/2006	101.1	110.2	104.9	110.3	105.1	113.3	106.1	110.5	104.8	116.1	101.2	115.1	104.6	112.3	104.4	117.3	112.7
08/03/2006	100.8	114.6	104.7	111.1	105.6	114.8	107.0	110.5	106.7	114.3	101.6	115.7	105.9	113.5	104.9	118.2	113.3
08/04/2006	100.9	114.5	104.7	110.8	106.5	115.4	108.5	112.2	107.0	115.1	101.7	115.6	105.6	112.6	104.5	117.9	112.3
08/05/2006	100.9	114.2	106.7	111.6	106.7	115.8	109.6	113.7	108.0	116.7	101.9	115.8	105.1	113.1	105.1	118.1	115.0
08/06/2006	101.6	114.2	106.9	111.8	106.8	115.1	110.4	112.5	107.6	116.3	103.7	115.2	108.1	114.7	107.5	117.9	**115.7**
08/07/2006	102.3	113.8	107.3	111.6	107.7	116.3	111.3	113.6	108.5	115.0	104.1	115.0	107.4	114.3	108.0	117.4	115.0
08/08/2006	102.6	114.9	107.7	113.8	107.7	115.8	111.0	112.9	107.7	113.6	103.7	115.0	105.3	112.2	105.5	117.1	112.8
08/09/2006	101.5	115.1	108.9	111.9	107.7	115.5	110.7	113.5	107.0	116.4	104.9	116.6	104.7	112.0	104.4	117.6	114.3
08/10/2006	101.9	115.1	107.6	111.5	108.2	116.0	110.6	114.1	106.8	116.2	105.6	115.8	106.7	113.2	104.6	117.9	112.1
08/11/2006	102.0	115.0	107.8	111.4	107.6	116.9	110.4	113.6	105.0	114.3	104.3	115.1	105.1	112.3	103.9	116.9	111.4
08/12/2006	101.3	113.0	106.6	110.9	107.9	115.5	109.8	113.6	105.7	113.1	103.7	115.1	105.6	112.8	103.8	117.1	113.5
08/13/2006	100.9	113.1	106.0	110.4	107.9	112.8	110.2	111.2	106.3	115.4	103.9	114.1	107.7	113.6	105.2	117.2	**115.2**
08/14/2006	101.0	112.8	107.8	111.1	108.1	113.1	110.8	110.4	105.7	113.2	105.1	115.0	108.1	113.3	107.2	116.9	**115.1**
08/15/2006	100.7	114.8	108.7	110.9	108.0	114.3	111.1	111.0	107.3	114.3	103.4	114.3	106.3	112.1	106.1	116.6	111.5
08/16/2006	100.6	114.8	108.3	111.7	107.8	116.7	111.3	113.4	106.4	113.4	102.4	114.7	103.4	110.6	103.6	117.5	111.4
08/17/2006	100.8	112.0	107.7	113.1	106.8	114.7	110.5	112.2	105.4	115.8	101.8	114.6	103.2	111.6	102.1	117.3	113.2
08/18/2006	101.1	111.3	106.1	111.8	106.2	114.7	109.4	114.2	103.9	116.3	103.3	115.6	106.9	113.3	104.1	117.6	114.8
08/19/2006	101.5	112.3	106.3	111.9	107.5	114.9	110.0	113.0	105.0	114.6	103.9	115.1	108.0	114.3	108.6	117.7	**115.4**
08/20/2006	101.0	115.2	107.8	112.1	107.9	119.8	110.5	114.2	105.3	112.9	103.6	114.8	108.1	114.0	109.7	117.8	**116.6**
8/21/2006	101.1	114.9	108.1	111.7	108.5	114.5	111.1	111.9	106.6	116.6	103.3	114.9	107.2	113.3	108.6	117.5	114.4
08/22/2006	101.0	114.9	108.8	111.7	108.6	119.4	110.8	113.7	105.7	115.9	102.4	114.8	105.2	112.0	105.3	117.3	112.9
08/23/2006	102.1	114.8	107.9	111.5	107.0	114.2	110.3	113.4	104.8	114.6	102.1	114.9	103.8	111.1	102.8	117.1	111.3
08/24/2006	102.5	112.5	107.6	111.6	106.9	115.1	110.0	113.1	103.2	113.5	102.7	115.4	103.8	112.0	102.6	117.4	111.4
08/25/2006	101.8	111.9	105.9	111.4	106.8	113.8	109.4	111.1	103.3	115.9	103.7	115.9	105.6	113.3	103.9	117.5	114.0
08/26/2006	101.2	109.6	106.4	110.0	106.4	113.5	108.6	111.8	104.0	116.7	104.1	117.2	107.6	114.7	107.6	117.9	113.9
08/27/2006	101.2	109.6	106.8	110.3	106.5	110.4	108.9	110.5	103.8	113.6	104.0	115.4	108.4	114.7	110.6	117.7	114.0
08/28/2006	101.9	117.8	107.4	112.0	107.3	114.2	110.1	110.4	105.5	113.4	104.4	115.8	108.8	114.5	111.2	117.4	**115.3**
08/29/2006	100.6	118.3	109.1	110.5	108.4	113.6	110.0	109.8	104.5	115.6	103.9	116.7	106.6	113.0	108.1	117.6	112.0
08/30/2006	99.7	117.7	107.0	110.5	106.3	115.0	108.1	111.5	102.6	115.4	102.8	116.3	103.9	111.4	104.1	117.3	111.3
08/31/2006	99.7	118.2	103.9	110.8	104.5	113.1	106.8	111.8	101.1	114.0	101.9	114.9	105.4	112.7	103.7	117.3	111.9

Generated: Fri Sep 1 23:25:14 2006

Number of hours of data reported in a given day



Big, bold, red text denotes exceedances.
--- indicates No Data
Dates run from hour 1 to 24 (not 0 to 23).
The gas caps shown only apply when spilling to facilitate juvenile fish passage ("voluntary spill") between April 3rd and August 31st.
At all other times, the gas cap is 110%.

Total Dissolved Gas Monitoring Stations

Code	Station Name
LWG	Lower Granite Forebay
LGNW	Lower Granite Tailwater
LGSA	Little Goose Forebay
LGSW	Little Goose Tailwater
LMNA	Lower Monumental Forebay
LMNW	Lower Monumental Tailwater
IHRA	Ice Harbor Forebay
IDSW	Ice Harbor Tailwater
MCNA	McNary Forebay
MCPW	McNary Tailwater
JDY	John Day Forebay
JHAW	John Day Tailwater
TDA	The Dalles Forebay
TDDO	The Dalles Tailwater
BON	Bonneville Forebay
CCIW	Bonneville Tailwater (Cascade Island)
WRNO	Bonneville Tailwater (Warrendale)
CWMW	Camas / Washougal

Effective April, 2006